Vol. 4, No. 4

MicroWINGS Magazine

OFFICIAL MAGAZINE OF THE INTERNATIONAL ASSOCIATION FOR AEROSPACE SIMULATIONS

Microsoft's Flight Sim for Win95!

Understanding Spins

Apollo's Europe II Scenery

Making NDB Approaches

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from the editor

The MicroWINGS conference starts Thursday evening, October 31st to November 3rd, and if you have not yet registered to attend, do so now! Attendees will be able to see the latest products and meet with representatives from companies including Microsoft, Sierra, Looking Glass Technologies, Jeppesen, Lago, Aerosoft, AETI, Apollo, Flight Sim Central, Kikiware, Microscene, TekMate, CHS Distributing, Nomissoft, Pilots, R&R Electronics, Virtek, columnists from MicroWINGS, and other fellow flight sim enthusiasts. We have attendees already registered from Canada, Mexico, South America, Europe, the Caribbean, Australia, Japan, and of course the USA.

One of the highlights of the conference will be the release of Microsoft's Flight Simulator For Windows 95. To get a preview of what you will see, read our preview of FS95 here in this issue. Conference attendees will be able to experience FS95 with not only the latest yokes and panels, but also in a fully-enclosed, full-size, two person cockpit!

Enrico Schiratti will be using his Schiratti Commander (a.k.a. Flight Zone in the USA) to link various PC's at the conference for live, real-time flying under multiple ATC control. We may even be linking live via CompuServe for truly international coverage.

For more of what you will miss if you don't attend, be sure to see our sneak peeks section. Sierra will be showing an advanced preview of ProPilot at the conference.

As you may surmise, the conference is an unforgettable, super event for flight sim users from around the world. If you have been reluctant to register, go ahead and get it done now so you won't be left out.

This issue has a lot of hands-on flying skills in it - from how to make NDB approaches, to how to come out of a spin. With your nerves back on track, follow the Round Robin as you fly the north eastern USA. While you're flying, be sure to take some time to read the reviews on the excellent Europe II scenery from Apollo Software and the On-Top IFR sim from Precision Training Software. When you get back from your flights; sit back, relax, and watch some videos from Just Planes Videos (also reviewed in this issue).

No one can deny that a good set of flight controls (yokes, panels, rudders, etc.) will add immensely to the realism of a PC based sim. Not too many companies produce flight controls of the quality that our latest commercial member does... **Precision Flight Controls**. Please welcome them to the growing list of MicroWINGS commercial members.

I hope to see you at the conference... *[MW✈]*

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NOTAM'S

News Bits From Around The World

Microsoft Looks Good For November Release Of FS95

Microsoft, it appears, will be making good on their November 7th projected release date for their newest version of Flight Simulator, Flight Simulator for Windows 95. (See preview in this issue).

Precision Flight Controls Joins MW

The latest commercial member of MicroWINGS produces high-end, precision flight controls and desktop panels for use with the leading simulations including Flight Simulator, Elite, IFT-Pro, On-top, and others. Precision Flight Controls will also be allowing MicroWINGS members to purchase hard to find parts for those building their own cockpits. These might include throttle levers, knobs, or even the entire throttle control system (single, dual, and jet!), gear switches, etc.

CHS Distributing To Sell FSFX in the USA

CHS will be distributing and selling the popular FSFX upgrade for Flight Simulator 5.1. CHS will also be carrying the entire CH Products line as well as new titles to be announced soon.

Sierra Slips ProPilot To Q1/97

Sierra has extended the release date for their much anticipated new simulator, Pro Pilot, to 1st Quarter 1997. The move was made to ensure a complete, robust, and stable product will be delivered to anxious users around the world.

Two Full Size Cockpits To Be Shown At The MicroWINGS Conference

MicroWINGS will be bringing their enclosed, two-person simulator to the MicroWINGS Conference for all attendees to see, try, and fly. Hans Kiener will also be bringing down his airliner cockpit complete with projection video system. *[MW→]*

MicroWINGS Magazine

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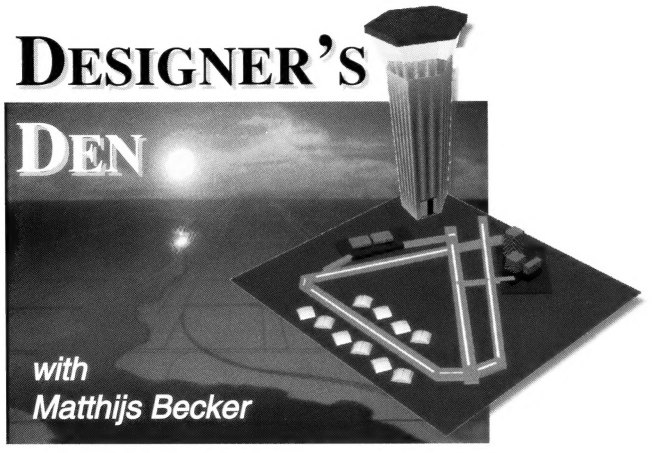
MicroWINGS Drawing Winners!

The Jul/Aug Drawing Winners Are:

Dennis Young of North English, Iowa has *Apollo's Europe II scenery* on its way to him. Congratulations!

Cristian Phillips of Santiago, Chile has BAO's *Flight Sim Flight Shop CD* on its way to him. Congratulations!



Designing The Buildings And Objects At And Around The Airport

In the last issue I told you how to add the runways with navigation aides and taxiways. Now it's possible to land your aircraft, but that's all. So now it is time to make the airfield more vivid; by adding buildings, hangars, aircraft, etc. These objects can be added by using Airport v1.21.

(Note: the following assumes you have been following me through the last two issues where we've discussed using Airport v1.21. If you do not have those two issues, i.e. if you are a new member, I urge you to call MW and order them as back issues so you can better follow along on.)

The first thing to add now are the tarmacs, necessary to park aircraft. This option is not straight forward in Airport; since their is no built-in tarmac object, you have be creative by adding instead a (very big) taxiway to serve as a tarmac. Most of the time the tarmacs are situated beside a taxiway.

To get a hold of the co-ordinates from a reference-point, go to the scene-menu and point to the corners of the tarmac that are adjacent to the taxiway you are placing the tarmac next to. Write them down on a piece of paper. Make sure you don't go over the center line of the taxiway, otherwise it will disappear in FS5.

The following is going to get messy, math wise, so go slow and try to follow me. I have some examples near the end of the paragraph to help out…

Now go to a corner that is situated on the other side (not adjacent to the taxiway), it isn't possible to know this point precisely, but that doesn't matter. Note that the angles of the corners must be 90 degrees, because you are working with rectangular taxiways. After that you can do the same with the fourth corner, or you can calculate it by adding the vector of the second point on the taxiway to the third point up to the first co-ordinates (remember your mathematics lessons from high school and college, calculating with vectors). Now calculate the average from the x and y-co-ordinates from two

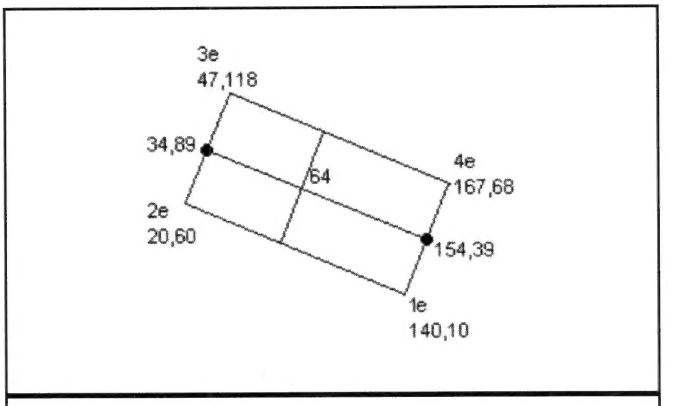


Figure DD.1 - Laying out a tarmac with a taxiway requires some basic geometry calculations to get the coordinates.

points that are situated beside each other, it doesn't matter which two, as long as they are next to each other, and do the same for the other two corners. Next, you need to know the distance between the two points you calculated the average from. For this you need the Pythagorean theorem of geometry. If the co-ordinates from the first point are a (x-direction) and b (y direction), and for the other x and y, the distance (the width) is the square root of $(a-x)^2+(b-y)^2$. Make sure your scale is 1, otherwise you have to convert this number. Let me give you an example to clarify this calculation and take a look at figure DD.1. Let's say you found that the co-ordinates from the points on the taxiway are (140,10) for the first and (20,60) for the second, and the third point should be somewhere around (47,118). Now you can calculate that the fourth point should be (167,68), because the vector from the second to the third point is 27, 58 [47-20=27 and 118-60=58], so this vector added up to the first co-ordinates gives (167,68). The average of the first and fourth point is (154,39) [(140+167)/2=154 and (10+68)/2=39], and the average of the other two points is (34,89). Now calculate the distance between point one and four, this is the square root of $(167-140)^2 + (68-10)^2=27^2+58^2=4093$, and the square root out of 4093 is roughly 64. Now you can input this information in the apt-file. In this case it should be:

route 11
-couleur = 03 03 03
-largeur = 64 M
-point = 1 34 89
-point = 2 154 39

Here as well it is possible to add center lines as described in the last issue. Now you can build the buildings and hangars wherever you want.

Buildings In The Scenery

In Airport it is rather easy to add buildings to the scenery, often it is only necessary to write the x and y-position and the length, width and height of the building and the direction. This is done by the 'batiment' section (batiment is French for building), for example:

batiment 1
-posx = 100
-posy = 130
-longueur = 200 (the length)
-largeur = 50 (the width)
-hauteur = 3 M (the height)
-orientation = 90 d (the direction)
-type = 00000

The above places a beige square building, complete with windows, of which some are illuminated (don't write the English words between the parentheses in your APT-file of course, they are just explanations). With the type function you can change the color and the shape of the building, as you can see in figure DD.2. The first two bits are to change the shape of the building. If only the first bit is activated (10000) then the building has inclined walls. I have to say that this is quite funny, but unrealistic to see, you might think the building has collapsed. If only the second bit is activated (01000), the roof will be higher on the one side then on the other side. If the first two bits are both activated the building will be octagonal. The other three bits are for the color of the building. If only the fifth bit is activated the building will be white, if only the fourth bit is activated the building will be dark gray, and with the fourth and the fifth bit activated the building will be light gray. Notice that the color of the building depends on where the sun is, for exam-

Figure DD.2 - Some of the different types of building shapes, colors, and windows available to the scenery designer.

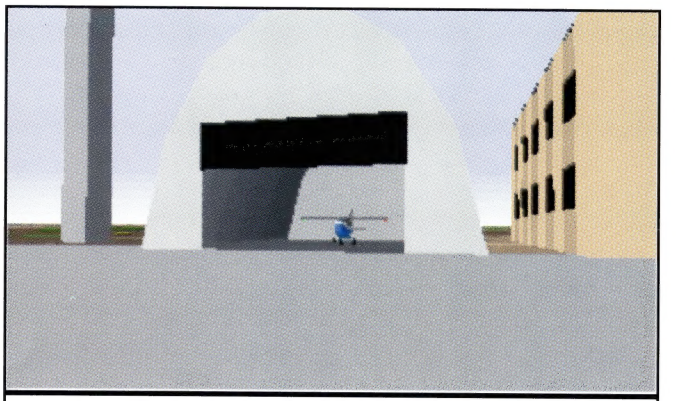


Figure DD.3 - A Cessna sits inside a Hangar.

Figure DD.4 - Examples of different hangar types available.

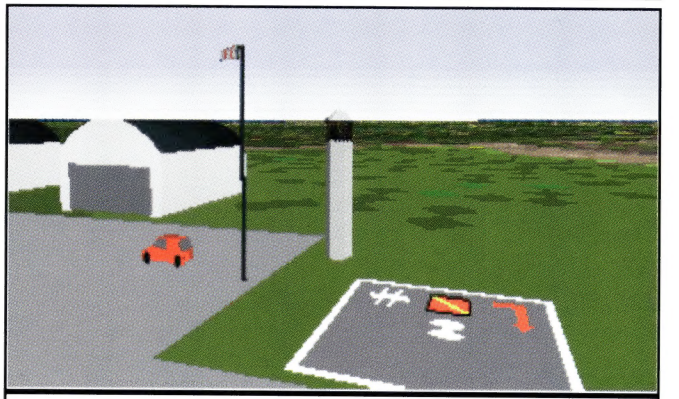


Figure DD.5 - A tarmac, car, flag, hangar, tower, and sign area.

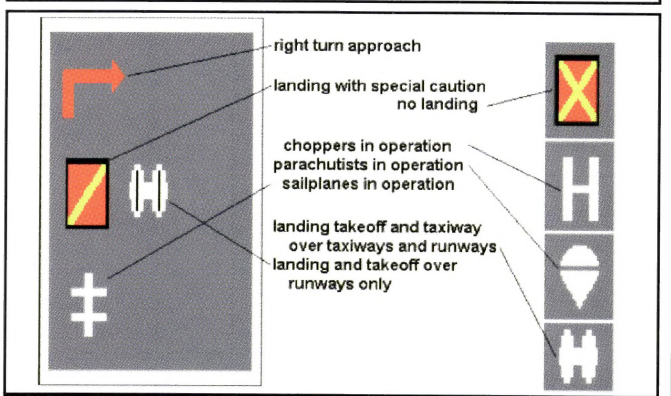


Figure DD.6 - Examples of different sign/signal types available.

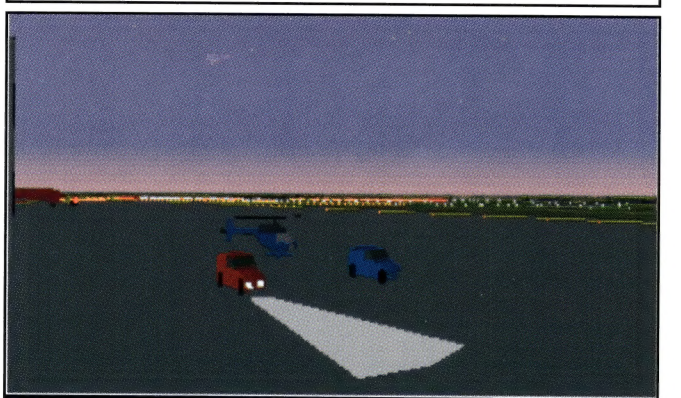


Figure DD.7 - Examples of different 3D objects/vehicles.

ple in the morning the color of wall on the east side of the building will be lighter then in the evening, and for the west side vice versa. If the third bit is activated, there will be horizontal or vertical bands over the walls. if the type is 00100 the bands will be vertical and gray, and the building white, if the type is 00101 the same, but with horizontal bands. If the type is 00110 the building will be beige with horizontal gray bands, and at last if the type is 00111 the building will be gray with vertical dark gray bands. Of course different kind of shapes can be combined with different kind of colors.

Other Objects In The Scenery

The buildings are the easiest objects to add, although other objects are not too difficult either. With Airport v1.21 there is a large list (in appendix 7) with different kinds of objects (such as hangars and towers) necessary to build an airfield, but also other objects like houses, trees, and boats. The objects are divided into two groups: The first are the adjustable 3D objects, and the second the semi-adjustable 3D objects. The difference between the two is that in the first group you can change both the length and the width of the object, but in the second group you can only change the relative size (so if you wanted the object to be twice the length, the width would also have to be twice as large). The way of writing commands in the APT-file will differ, of course, as well. For example: If you want to add the control tower object with the (file)name "tourct2", you would have to input:

poly3d 1
-type = tourct2
-posx = 408
-posy = 213
-longueur = 5 (the length)
-largeur = 5 (the width)
-hauteur = 22 M 24 M (the height)
-couleur = 03 03 03 (the color)
-orientation = 60 d (direction)

Notice that it is possible to change only the length without changing the width, although your control tower will not be a square anymore. The two values after 'hauteur' are for the altitude of the floor of the cabin and the altitude of the roof. You can find this information in the example-files with the names "lfex.apt" and "lfbp.apt". To show you the difference with the semi-adjustable objects I have an example of a hangar with the name "&hangar4". Note that in the name of a semi-adjustable object there is always a leading "&".

poly3d 4
-type = &hangar4
-posx = 182
-posy = 341
-orientation = 240 d (direction)
-taille = 1 (size)
-couleur = 02 04 01 (the color)
-hauteur = 3 ft (the height)

In this section you won't find an option for the length or the width, this is all assembled in the option 'taille' (French for size). If you want the object to be twice as big, make the size two times bigger. This hangar, as well as the other semi-adjustable hangars have the option that the door will automatically open when an aircraft approaches the hangar, as shown in figure DD.3. The black door is half opened, and you can partially see what is inside the hangar (a Cessna). Most of the time it isn't possible to situate something in the hangar, because the computer will draw it as if it was in front of the hangar instead of inside (a problem of display priorities).

The Different Objects Available In Airport

In appendix 7 you can see a list of all the objects that are available in Airport v1.21, and useful to use in your airport. About the adjustable objects, only the two towers are very useful, if not necessary. By changing the altitude you can use them for both small and big airfields. The three hangars are useful as well, but they don't have the automatically opening door, and I couldn't find a door in both hangar1 and hangar3. Happily the semi-adjustable objects are more useful. These hangars are in general more useful for your scenery then the adjustable hangars. In figure DD.4 you can see a couple of hangars and buildings. From the left to the right you see hangar2, hangar3, &hangar4, &hangar1, tourct2, &hangar3, and a building (type 'batiment'). Other objects to make the scenery around the airport more vivid are ships (&ship1 till 4), trees (different types and shapes), flags (different countries), antennae, etc. If you are designing a small airfield perhaps you can use the signal area (&airesign). This is a place where flags can be placed, with commands and warnings to aircraft flying VFR, as you can see in figure DD.5. In figure DD.6 you can see the meaning of the different flags that are possible in Airport v1.21. You can change these flags only by changing the settings after the option couleur (color) in the APT-file, so it is unfortunately not possible to change it dependent on the weather or daytime. It is also not possible to change the arrow to a left turn approach. In figure DD.5 you can also see a windsock near the signal area, which always points the wind's direction, and the shape also depends on how strong the wind is, and even the turbulence. With this information you can land without using the ATIS-information on the radio, nice in the case that ATIS is not available in the area you want to land. Other objects also point to the wind's direction, such as the chimney (&cheminee1 and 2) and the different flags (&flag...).

Points To Pay Attention To

Sometimes it can happen that your object doesn't appear in your scenery. In that case you have to check a couple of points. First, go to the scene-menu and check if on the point you thought the object should be, a square has been drawn, if not, it is possible that it is drawn on the wrong place, check it in the APT-file. Second, see if it helps when you add the

option hauteur (altitude) with the altitude above sea level to avoid the object being placed under the ground, this of course only with the semi-adjustable objects, because otherwise the height of the object will be used. You can find the altitude in the scene section, or otherwise you can go to the place and look on your altimeter (check the barometric pressure). To get the ground-altitude subtract a couple of feet (e.g. 2 for the Learjet) from the altimeter. This can especially can cause problems, because it is often not clear in the readme-files which options and settings have to be given. As already mentioned, check the example-files as well for information.

The Flying And Driving Objects

Finally it is time to add some objects like cars and planes in the scenery. There are two cars available, and they seem the same in daytime, but &car2 has illuminated lights at night as you can see in figure DD.7. Other 3D objects include a Bell JetRanger helicopter and as airplane. But it is also possible to put a Cessna, Learjet, military jet, airliner, and a fuel truck in the scenery and it is even possible to make them move (dynamic), like at the Chicago Meigs Field scenery. They are not listed in appendix 7, because they are different than the Airport v1.21 3D objects. How do we make them move? We'll cover the answer to that question in the next issue...

About the author - Matthijs Becker is an avid flight simulation enthusiast living in the Netherlands. If he is not flying, then you'll find him designing scenery for his native homeland. He can be reached via email at [L.J.Becker@inter.nl.net] on the Internet. [MW✈]

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FLIGHT SCHOOL

SPIN RECOVERY

Most of us who have logged several hundred hours flying PC flight simulators have spun into the ground more than once. Especially during the first few maneuvers at low altitude that required a relatively slow airspeed. Hopefully you have figured out how to prevent a spin from occurring in the first place or have become familiar with spin recovery. After this lesson you should understand what a spin is, when a spin is most likely to occur, and the proper recovery procedure. We covered stalls and proper recovery in a previous lesson and we will build on that knowledge.

SPIN vs. SPIRAL

A spin will usually be the result if recovery from a stall is not affected in a timely and appropriate manner by reducing the angle of attack. All spins are preceded by a stall on at least part of the wing.

A spin in a small airplane or glider is a controlled or uncontrolled maneuver in which the plane descends in a helical path while at an angle of attack greater than the angle of maximum lift. The term helical is defined as a spiral or corkscrew path downward, also termed "auto-rotation". The airspeed indicator will usually maintain a very low airspeed (see Figure FS.1). Spins result from aggravated stalls in either a slip or a skid and will maintain a high angle of attack until the pitch attitude is decreased, just like recovering from any other stalled condition. If a stall does not occur, a spin cannot occur. That's why it is so important to understand stalls in the first place. A pilot may be able to recover in less than 100 feet using quick recovery technique if an unintentional stall occurs in the traffic pattern. A spin, however, may require considerably more altitude once the airplane begins to roll-over in the direction of the spin.

Comparatively, a spiral is more of a controlled diving turn. The steep bank, low angle of attack and increasing airspeed are common to a spiral. The pilot can simply decrease the bank and level off without any unusual maneuvering if the airspeed has not exceeded the normal operating speed and enough altitude remains to allow for a smooth pull out. A standard commercial maneuver is to maintain a 60 degree bank, at a constant airspeed, while in a spiraling descent over a given point on the ground (see Figure FS.2). This may sound easy enough, but without practice, a pilot will drift downwind from the reference point on the ground or bust the given airspeed/bank very quickly. This particular maneuver is also a standard emergency procedure for a cockpit or engine fire. A slip will be added to the procedure to help direct the flames away from the cockpit if the engine has caught fire.

AIRFRAME STRUCTURE

Most airplanes are designed with spin resistance in mind. This is not to say they won't spin, but the airplane should show no uncontrollable spin characteristics no matter how you use the controls. It is not uncommon for most light trainers to recover from a spin if you simple take your hands and feet off of the controls. A high speed dive may result, but at least the airplane is not totally out of control.

The designed structural strength of an airframe is normally based on the use for which the airplane is intended. An acrobatic airplane with room for one pilot may be designed for strength versus a four place airplane designed for normal cross country flying. Aircraft are classified according to **normal, utility, and acrobatic** use. The design load factors of the classes are 3.8 Gs for normal, 4.4 Gs for utility and 6.0 Gs for acrobatic. The design load factor can be exceeded by 50% without incurring structural failure. Design limitations are clearly stated in the Airplane's Owners Manual.

OPERATING LIMITATIONS

Operating limitations are imposed for the safety of pilots and their passengers. Operations contrary to these restrictions are a serious compromise of safety. It is, therefore, most important that all

Figure FS.1 - Notice the low airspeed, stall indicator, turn & bank indicator, ailerons neutral, full right rudder, and full aft elevator - even though the we're at an extreme low pitch attitude in this spin.

Figure FS.2 - A std maneuver is to maintain a 60° bank, at a fixed airspeed, while in a spiraling descent, over a ground reference. Compare the spiral indications on the instruments with those of a spin.

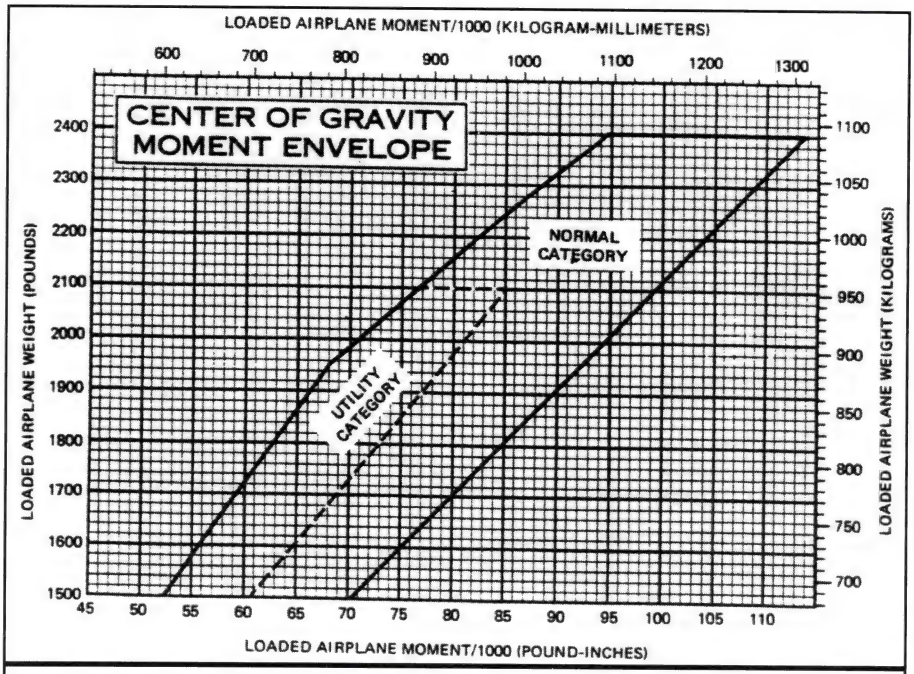


Figure FS.3 - Spins may be conducted if the Weight and Moment fall within the Utility category boundary. The baggage compartment and rear seat must not be occupied.

pilots apply proper spin practice with regard to the airplane being flown.

In most cases, this can be found in the Owners Manual for the airplane being flown. The Piper Cherokee 140B Owners Manual simple states " Intentional spins are prohibited in the **normal** category airplane". The Mooney Super 21 manual says "This aircraft is not approved for spins". The Cessna 150 and 152 operating handbook reads " This airplane is certified in the **utility** category and is designed for limited aerobatic flight. In the acquisition of various certificates such as commercial pilot, instrument pilot and flight instructor, certain maneuvers are required. All of these maneuvers are permitted in this airplane. No aerobatic maneuvers are approved except for chandelles, lazy eight's, steep turns, **spins** and stalls. Aerobatics that may impose high loads should not be attempted. The important thing to bear in mind in flight maneuvers is that the airplane is clean in aerodynamic design and will build up speed quickly with the nose down. Proper speed control is an essential requirement for execution of any maneuver, and care should always be exercised to avoid excessive speed which in turn can impose excessive loads. In the execution of all maneuvers, avoid abrupt use of controls".

The Cessna 172 Skyhawk is a good example of how careful a pilot should be when determining whether it is within limits to practice spins in a particular airplane. The airplane can be operated in both the **normal** or **utility** category depending on the weight and balance (see Figure FS.3). The normal category is applicable to aircraft intended for non-aerobatic operations. In the **normal** category the takeoff weight must not exceed 2400 lbs. , passengers may occupy the rear seats and baggage may be carried in the baggage compartment. All within limits, of course. In the **utility** category the takeoff weight must not exceed 2100 lbs. and the baggage compartment and rear seat must not be occupied. Chandelles, lazy eight's, steep turns (not to exceed 60 degrees), **spins** and stalls are permitted. The manual warns that this airplane is not designed for purely aerobatic flight. In future lessons we will cover some of these maneuvers and you will find them to be very controlled, smooth and with low g-forces; not at all stressful to the airframe.

The MS Flight Simulator, most of us fly, comes with the Cessna Skylane 182RG as a default aircraft. The information manual states "This airplane is certified in the **normal** category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eight's, chandelle and steep turns in which the angle of bank is not more than 60 degrees. Aerobatic maneuvers, including **spins**, are not approved.

Placards are placed in full view of the pilot stating the limitations for a given aircraft. In the case of the C182RG, we would see a placard on the dash somewhere that will state **"No acrobatic maneuvers, including spins, approved.** The great thing about flight simulation is that we have no limitations. We can spin a 747 on our ATP program, a A-7 Corsair on the U.S. Navy Fighter game or perform unlimited aerobatics with Flight Unlimited. With all the great airplanes being designed and available for down-loading from members of MicroWINGS there is no limit to the planes we can **spin**.

SO LET'S GO SPIN AN AIRPLANE

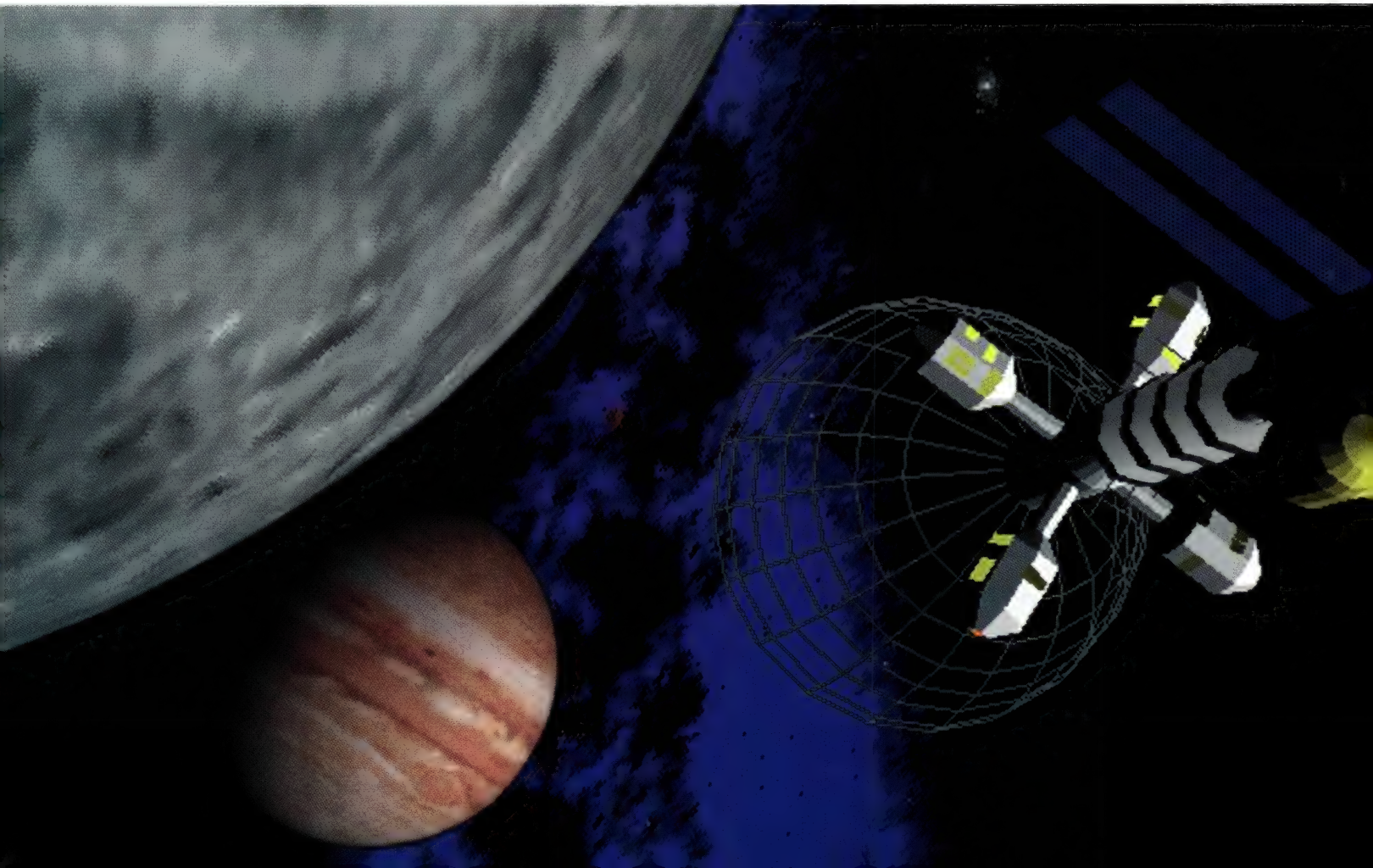
PRE-FLIGHT: The instructions contained in this lesson will refer to MS FS5.10-Cessna 182RG. If you don't have this particular simulation program, then use whatever program or plane you want. The main thing you need is separate rudder control. Some programs may not give you the option of separate aileron/rudder control, which will make it difficult to enter and recover from a true spin. Keep in mind the ailerons are not used to enter or recover from a spin. As a matter of fact, they should remain neutral during the entire maneuver. Even though we will be conducting this lesson over the Dallas, TX. area, you can choose any place you wish.

Figure FS.4 - In the Auto-Coordination=OFF setting, the Keypad's 0/Ins key will control the left rudder and the Keypad's ENTER key will control the right rudder. The Keypad's 5 key will center the rudder.

After the program has loaded and you have selected the practice area of your choice, you should be in a position ready for take-off. The **KEYPAD 0/Ins** will control the left rudder and the **KEYPAD-ENTER** will control the right rudder. On some keypads, the bottom-right key is the PLUS SIGN and on others it is ENTER. Ignore the keycap and use the bottom-right key. The **KEYPAD 5** will center the rudder. Zoom in close to view the airplane's rudder and ailerons. Watch the rudder and ailerons as you press the rudder control keys. Notice the ailerons will move, as the rudder moves, and will always return to the neutral position. Now go to the **Sim** menu and turn the **Auto-Coordination** OFF. Again press the rudder control keys and notice the difference (see Figure FS.4). Now you have rudder control and we will be able to practice spins in a more realistic manner. Set your joystick trim controls to neutral and press the **K** key to calibrate all trim controls. No joystick? Press the K anyway.

TAKE-OFF: If you have never flown the simulator with the Auto-Coordination OFF before, you may find this a valuable mini-lesson on rudder control, especially on take-off. When you first apply full-power, the rudder has very little directional control and a greater deflection of the rudder may be required to maintain a path straight down the center of the runway. As the speed increases the rudder will become more effective and less rudder deflection is required. Keep this in mind as the speed increases on take-off. Also, due to the engine torque and slipstream, which is a separate lesson in itself, you will probably find the airplane pulling to the left after full power has been applied. Use enough right rudder (KP-ENTER) to maintain, as much as possible, a take-off roll down the center of the runway. As the weight of the airplane is being transferred from the wheels to the wings you will need to keep your wings-level and heading-straight using a combination of aileron **and** rudder control. Use the trim and let the airplane fly itself during the climb. At this point, since it may take up to 15 minutes to climb to altitude, and after-all, the main purpose of the lesson is to practice spins, I choose to expedite time and get on with the lesson-at-hand. Try selecting the **World** menu, go to **Set Exact Location** and enter an altitude appropriate for spins. I've been starting at an altitude of 8,000 feet, from level flight, slowing the airspeed down to a stall, in preparation for the first spin. Aren't simulators wonderful?! I know there are other methods and if you want to use your own, do so. Just try get up to altitude so we can get in a few spins before being called to dinner.

THE SPIN: Tighten your shoulder harness and put everything else out of your mind. Spin recovery technique needs to be ingrained into your subconscious just like stall recovery. You should have the proper steps memorized so you react without thinking. There is no need to hurry or become emotional. Instructors who have taught spins understand what I'm saying here. We have unintentionally taught spin recovery while teaching stalls to a low time student who became very aggressive with the controls and executed a beautiful spin. Or, while conducting a bi-annual flight review, intending to observe a veteran pilot, who was a little rusty, demonstrate a stall, only to let it get away from him, and again, experience a beautiful spin from which to recover. That's why instructors are required to know spin recovery and have demonstrated their ability before receiving that CFI certificate. If the controls are not manipulated in the correct fashion, the spin will continue beyond a point of no return. How quickly and who executes the recovery, may depend on altitude, experience of the pilot, or the airplane itself. It is my opinion, a pilot who has



practiced spin recovery on a PC simulator, in the comfort of his/her own home, will be much better prepared than a veteran pilot who has flown hundreds of actual hours, but never experienced the thrill of an actual spin and recovery. Therefore, practice, practice and then practice again. Let's practice.

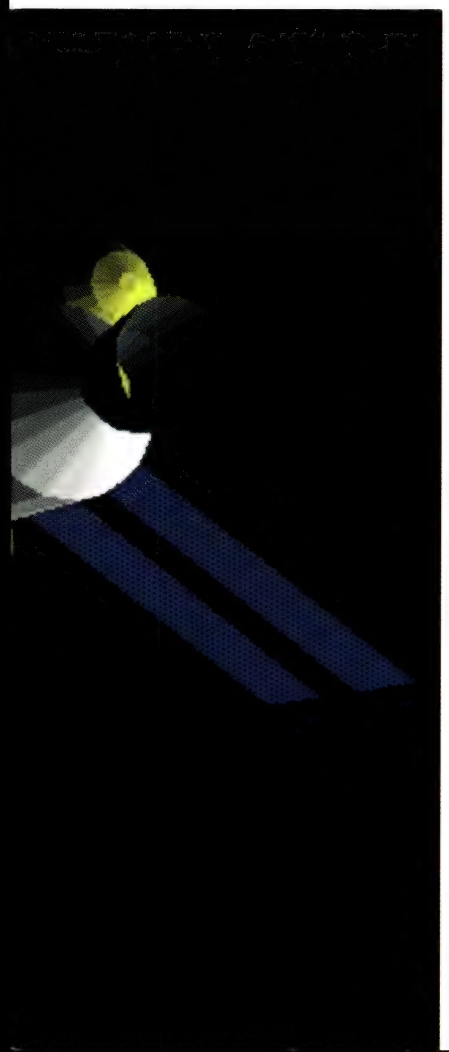
From straight and level flight reduce the throttle to idle. Maintain your heading, ailerons neutral and the pitch attitude just above the horizon. The airspeed will decrease to the point the stall indicator will come on. This is no different than the power-off stalls we practiced in a previous lesson. The difference is, as the stall occurs, we will apply full aft elevator and full rudder deflection in the direction of the spin. You will need to hold the controls in this position until recovery has begun. Even though the ailerons are in a neutral position, the airplane will roll in the direction of the spin and may seem to go inverted, as well as appear to be pointed straight at the ground. The airspeed indicator will read a very low airspeed, if any at all, but due to the angle of attack the instrument is unreliable. If it registers a high airspeed, your probably in a diving spiral rather than a spin.

The stages a spin goes through are defined as entry, incipient, steady and recovery (see Figure FS.5). We will begin our recovery at the beginning of the first steady turn. Apply full opposite rudder until the turn stops and just relax the elevator. As the turn stops, press **KP-5** to neutralize the rudder. This should be enough to recover from the spin. Now you find yourself in a steep dive that will require steady back pressure on the elevator to recover back to level flight. From the time the stall occurs, the airplane enters the spin and the recovery is complete, a matter of seconds will have past. This doesn't give you much time to think about what your doing. That's why you need to know what your going to do before you do it. If you are practicing spins, apply full power to climb back up to spin altitude, unless you have enough altitude to practice another. If this were an unintentional spin and successful recovery, you would probably need to orient yourself and get back on course. Of course we are practicing, so climb, or adjust, to an appropriate altitude to continue your lesson. Continue to practice until you feel very confident you would have no trouble recovering from an unintentional spin in the future. This means, after you have the technique down, begin to recover as quickly as possible. This will prepare you for the unintentional spin you hope will never come your way.

POST-FLIGHT: Some of the common mistakes made are:

1. Relaxing back pressure before recovery is intended. A good spin requires full aft elevator, and the attitude the airplane takes after the stall, sometimes makes the student's mind go blank. They may relax back pressure without realizing it. They may also tense up and need to be forced to let go of the controls to relieve the back pressure by the instructor. Usually this is not the case, since spins are not required for any other rating but instructor. By the time you're in that position, you would hold a commercial pilots license and an instrument rating and should be very comfortable with unusual attitudes. With other pilots the unintentional spin lesson can be a different matter.

2. Applying too much forward pressure. Usually, all that is necessary is to release the back pressure. No actual pushing forward on the elevator control is needed. Sometimes a student will push so hard as to cause a negative G. When this happens at a very low pitch attitude, all the dirt, maps, check-list or anything else that's



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Microsoft Home

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not secured in the cabin will become air-born. Dirt in your eyes at a critical moment like a spin, is no fun at all, much less being hit in the head by a flying briefcase. Therefore, it is a good idea to take as little as possible with you when practicing any unusual attitude flying. If nothing else, make sure everything is secure in the cabin or wear a helmet and safety goggles.

3. Not continuing to hold full rudder during the spin. Not applying full opposite rudder during recovery. Continuing to hold opposite rudder after the turning has stopped. Or, using the ailerons to try and recover instead of opposite rudder. Don't do that!!

4. If practicing from a power-on stall, failing to close the throttle after the spin is entered. You should also practice spins from a power-on stall. Just remember to close the throttle after the spin begins.

5. Pulling back on the elevator to recover. This won't work under normal circumstances. Since the untrained pilot sees the windshield absent of sky and filled with the ground, the natural tendency is to pull back. Hey, if you did a good spin you have already pulled the stick (yoke) back as far as it will go. The only thing left to do is break it off, let go, or push it forward.

6. Pulling back too soon after attempting recovery before the airplane has a chance to recover for itself. You may be ready to recover, but give the airplane time to catch up with you. Pulling back too much may cause a secondary stall or possibly a progressive spin. If you wait too long to recover from the dive, after a successful recovery, and find the airspeed near the red line, be gently about recovering. Remember the airplane does have design limits. There's no need to get in too much of a hurry. Just use common sense.

Other factors would apply in the real world of spin training. Things that the law requires would also be considered. It only makes sense that we wouldn't practice at low altitudes. Recovery must be executed before 1,500 feet AGL. Practice clearing turns before any unusual attitude and check the airspace below you before spinning into it. We would only spin an airplane that was certified for spins. We would never spin in a Federal Airway or over a populated area. Parachutes would have to be worn unless an instructor was teaching spins. There are many other facts and regulations we could study and I recommend you do so, if you so desire. The main thing at this point of the lesson is for you to be able to recover from a normal spin while flying at home. Experiment with spin recovery using all available programs and aircraft at your disposal. When you get proficient enough, try going to the **Sim** menu and select **Airframe damage from stress.** Try taking it to the limits, night spins, flaps/gear-up/down and so on. That's the great thing about PC simulator training, we are only limited by our computer's hardware/software.

The PC flight simulator we fly at home is not just enjoyable but a very valuable tool we can learn a great deal from if taken seriously. I have made it a common practice to simulate flight maneuvers, cross-country flights and emergency procedures before embarking on the real thing for many years. Even though the sound, g-forces and sweat that goes along with the real thing is missing, the proficiency and sequence of pilot tasks required to maneuver the airplane are essentially the same. By practicing certain maneuvers at home on the simulator and reading related material on the subject, we can anticipate what the real thing will be like and be better prepared for the unexpected.

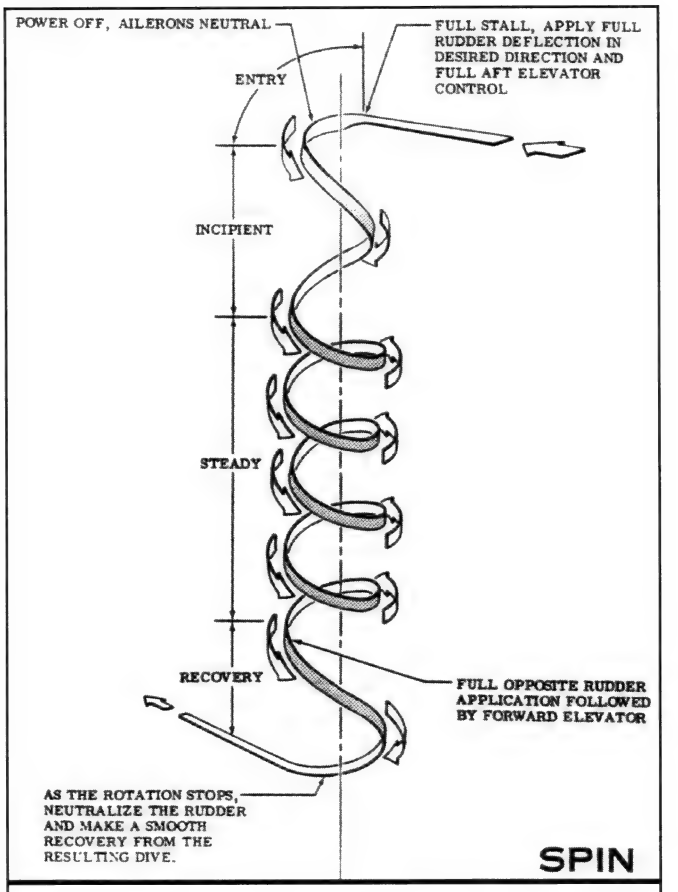

POWER OFF, AILERONS NEUTRAL
FULL STALL, APPLY FULL RUDDER DEFLECTION IN DESIRED DIRECTION AND FULL AFT ELEVATOR CONTROL
ENTRY
INCIPIENT
STEADY
RECOVERY
FULL OPPOSITE RUDDER APPLICATION FOLLOWED BY FORWARD ELEVATOR
AS THE ROTATION STOPS, NEUTRALIZE THE RUDDER AND MAKE A SMOOTH RECOVERY FROM THE RESULTING DIVE.
SPIN

Figure FS.5 - Begin recovery at the beginning of the first steady turn, until you feel confident. Then recover after several turns for practice. Your goal will be to recover as soon as possible to prepare yourself for the unintentional spin of the future, that you hope never comes your way.

Stall/spin accidents account for approximately one-quarter of all fatal general aviation accidents. National Transportation Safety Board statistics indicate that most stall/spin accidents result when a pilot is distracted momentarily from the primary task of flying the airplane. VFR pilots flying into IFR conditions have also contributed to spin fatalities. No fatalities have been recorded, that I know of, from a stall/spin accident on a PC simulator. Although I have hit my knee on the desk a few times. That's why it will be fun to spin every aircraft you have loaded into your data base and become familiar with the spin characteristics of each. I must also admit there has been a few times my blood pressure increased dramatically trying to recover from a spin in the Learjet. And then there's the disappointment of having to eject from an F-104 after entering an unrecoverable spin (U.S. NAVY FIGHTERS). Maybe I'm taking this too seriously at times. Take the time to become familiar with spin recovery in the airplanes you fly the most, and a feeling of confidence will be your co-pilot on every flight.

About the author - Bob Pursur has been flying in the Dallas, Texas area since 1973.He has been a CFI since 1977 and has been flying computer simulators since 1980. He is a Systems Tech. with Southwestern Bell Telephone and flys out of the Lancaster and Addison airports. He can be reached via Internet email at [ursa@airmail.net]. [MW✈]

Review Of: Just Planes Videos

No company could be truer to their name than Just Planes Videos. With more than 50 titles to date, they have just about every modern commercial and regional passenger aircraft captured on video. Most of the titles make up the "Flight In The Cockpit" series. There are also a series on airports which features aircraft operations at the airport covered by the video. Another series features some of the splashier paint schemes on aircraft from around the world. If you love the classic DC-3, they have a special video on it and how it is used currently throughout the Caribbean. Just Planes Videos even has a series for children who are fascinated by planes, called "Just Planes Videos for Kids". If you ever wanted to know who all flies a particular plane, you can view their "Airlines Flying The ____" series (where the blank is a particular aircraft type such as the Boeing 747). Their newest series is called "View From The Cockpit".

Flight In The Cockpit

This series, their most extensive, usually features one type of aircraft (example, The Boeing 727) and lets you be a fly on the wall, listening in and watching the preflight briefing, pre-flight inspection, cockpit checklists, and then the flight itself (including the final approach and landing). Throughout the flight, the video is constantly panning the instrument panel and controls - allowing you to see what all is happening in the cockpit during a real flight. All flights on Just Planes Videos are real, scheduled, passenger carrying flights. Most videos have at least two different flights on the video tape.

Not only will these videos take you aboard your favorite aircraft, but they will also take you around the world since destinations range from Miami, Florida to Kai Tak, Hong Kong! Since the FAA has very strict regulations on who can be in the cockpit on a passenger carrying flight, Just Planes Videos is filmed predominantly on international carriers. Language will not be a problem though, since English is the universal language of Aviation. At times, the accents can be difficult to understand, but overall the videos will appeal to anyone who can understand English. The most common carriers shown are Lufthansa, Cargolux, Crossair, Carnival, Turkish, VASP Brazil, and Sabena. Currently, the series has videos on the B727, B747, B737, B767, A300, A310, A320, A340, Avro RJ85, Saab 2000, etc.

Airports

The Airports series lets you pull up a seat right along the runways at major airports. Non-stop action of all sorts of planes and the carriers that operate them, will appeal to those who have always wanted to pull off the road to watch airplanes land and takeoff. But, here you have the best, closest seat you can get, as well as being able to see how the variety changes depending on the airport.

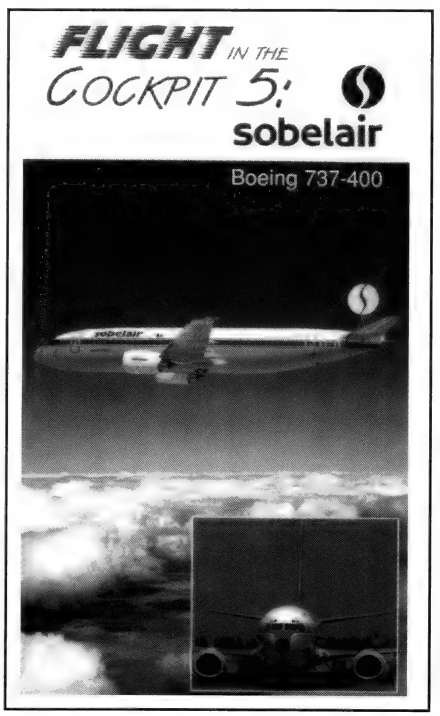
This series currently features the following airports with the year in which the video was taken shown in parenthesis: Los Angeles, Beijing, Hong Kong, San Juan (Puerto Rico), JFK (New York), Boston, Newark, Las Vegas, Ho Chi Minh, Atlanta, Miami, Bangkok, Caracas, Paris, Mexico City, Ft. Lauderdale, Orlando, O'Hare, Midway, San Francisco, Fairbanks, Frankfurt, Zurich, Prague, and others.

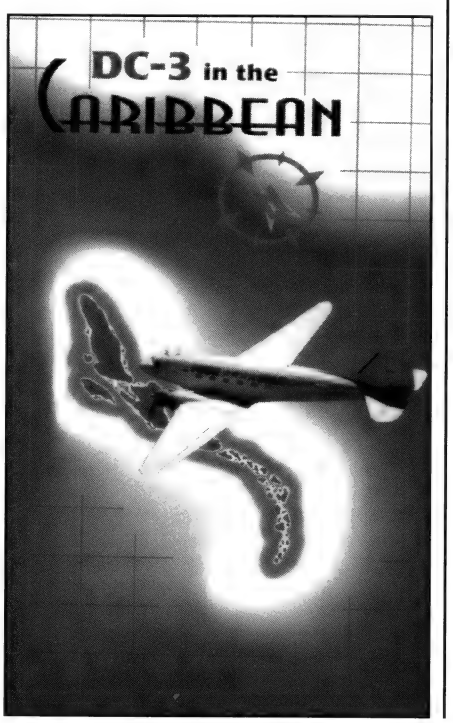
Flying Colors

This video features non-stop filming of the more unique paint schemes visible on the aircraft of today's airlines from around the world.

DC-3 In The Caribbean

This was one of my favorite videos to





Everything you ever wanted to know about planes but didn't know who to ask
It took 15 days to paint me!
I was designed by an 11 year old girl.
You'll see us on this video.
I was designed by a 12 year old girl.
"Here's a great kids-eye-view of how it all works... And, that's the 'plane' truth!" —Myles Calum TV GUIDE

watch from the Just Planes Videos collection. Through the video, you get to meet a pilot of a DC-3 based in San Juan, Puerto Rico. The pilot tells you all about the intricacies of the famous prop aircraft. Even small tidbits of information such as the fact that no two cockpits are the same. The history of the particular DC-3 filmed is also covered, including where it was built, who has owned it, and how it arrived to each owners location (this DC-3 has literally been around the world!).

No video would be complete without a view from the cockpit. This one is exceptional though, as we get to fly in the cockpit on flights to/from San Juan and St. Thomas (US Virgin Islands). Takeoffs, Landings, etc. are all featured including cockpit instrument and control scans. This video is a must if you love the older birds, especially the venerable DC-3.

Airlines Flying

This series features a particular aircraft, and shows videos of all the different airlines that fly the respective aircraft covered. Aircraft in this series include the Boeing 747 (showing over 130 airlines who have operated this 'heavy' since 1969).

Just Planes For Kids

For the little pilots, three titles make up this special series intended for children. In the ages 3-9 category, they have a video around the theme of "Everything you wanted to know about planes, but did not know who to ask". The next two are about flying on an airliner. The first is titled "Nathalie Prepares To Takeoff" and the second is a continuation called "Nathalie's First Flight". All four titles are wonderful for both the child that loves airplanes and for the child that is getting ready to take their very first flight on an airline.

View From The Cockpit

This newest series is very similar to the "Flight From The Cockpit" series, but instead of keeping the video aimed inside the cockpit, the video is kept looking outside the cockpit (i.e. the 'view'). Breath taking flights (both day and night) show you the view from taxing behind other aircraft, to takeoffs, climbs through clouds, cruise, descents, and the approach to final and the landing itself.

These are great videos to compare your simulator's graphics to, especially the climbout through clouds and the final approach and landing phases. It is also very good for comparing your ATP (airliner) type flying methods to what happens in the flights filmed (which are real, scheduled, passenger carrying flights).

Summary

I can't imagine why any aviation enthusiasts (other than an airline pilot), especially flight sim users, would not want to have at least one video from each series as part of their home video collection. Just Planes Videos average about $19.95 (USD) per video. You can request a catalog from them by calling 800-PLANES-6 (in the USA), 617-539-3226 (outside the USA), or by sending an email to Justplanes@aol.com. We also have a link to their website from ours, under our Other Cool Webs section. *[MW✈]*

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Enjoy the most spectacular sights of Hong Kong with a new scenery enhancement for Microsoft Flight Simulator version 5.1!
Test your skills while flying the breathtaking Checkerboard Approach into Hong Kong Kai Tak Airport!
Discover the night life of Nathan Road with stunning new type of night scenery!
CD-ROM version includes soundfiles with real recorded Hong Kong ATC, precompiled adventurefile for use with BAO Flight Simulator Flight Shop ™, Final Approach shareware version with approachplates of all included airports and more
FSWG MADRID
Photorealistic scenery enhancement based on LANDSAT 5 satellite images with resolution up to 6m. Available on CD-ROM.
Coming soon:
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Scenery enhancement covering the area of Rio de Janeiro / Brasil.
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CROSS WINDS

with Charles Gulick

Load Factor

Lately I've felt overwhelmed by the number of user-designed aircraft being uploaded to lib 5 of FSFORUM, and by the wealth of user-designed scenery being uploaded to Lib 6. I just can't keep up with it all and take care of my puppy, Sandy, too. So, the dog has to go. (Just kidding!)

In the course of just a few days I downloaded probably six aircraft to try, and massive scenery files of Maryland-Virginia (designer Alan Misiaszek), and of the state of Pennsylvania (by Robert Shisler, Jr.), among others. Meanwhile my downloads directory is backed up with weeks and even months of other stuff I downloaded because it sounded interesting, until now I don't recognize the files by their names, and have no idea what is in most of them. I am a victim of aircraft/scenery overkill.

This situation does my ever-threatening ulcer no good, and doesn't make a happy pilot of me. Instead, it discourages and depresses me. One day drifts into another and I get farther and farther behind. So, I've decided something should be done about the situation.

Realism

Let's be realistic for a moment. In the real world, I don't own a single airplane, although I once was part owner of a Cessna 150 (with about seven other guys, and I never met one of them). And as for scenery, I go virtually nowhere (unless taking my puppy for a walk twice a day or going shopping a couple of times a week can be considered going somewhere). So why do I need everything in aircraft from an ultralight to a Boeing 747? Who am I kidding? And do I really need scenery of Vera Cruz, where I've never been and probably never will go, nice as it may be there? No. If I were the richest man in the world and, say, made a hobby of collecting airplanes, I still wouldn't have everything from an ultralight to a 747. Where could I possibly keep them all? And I wouldn't be able to travel the four corners of the earth endlessly, no matter how much money I stole; I'd still have to make it a *major* decision whether to take a trip to Vera Cruz (right now, I couldn't even tell you where Vera Cruz is!)

So... K.I.S.S. comes to mind (which for my foreign friends unfamiliar with American slang means Keep It Simple, Stupid). I've lately decided that I'm going to simplify things *drastically*. I'm going to have much less, and use what I have more intelligently. I think I'll settle on six or perhaps 10 airplanes—tops. And maybe just the obvious continents, though I really don't know if there are such things).

Airplanes

First, as to airplanes, I'll consider the default ones. There's the Cessna 182... but I never fly it. Instead I fly three other Cessnas:

1) The Power 182, which is my livelier version of the default 182; This airplane I've dressed up with Wayne P. Russell's "blue" R8 textures, one of which puts a pilot in the left seat (or, for that matter, in the right seat also, should you view the plane from the right side).

2) The Cessna 152, which is again a concoction of mine, made from the default 182, but with fixed gear and with weight and power changes that make it fly pretty much as I remember the real Cessna 150 flew a couple of hundred years ago. Since the blue textures and the pilot were available, I applied them to the 152, too.

Figure CW.1 - The OB-C172N is just one in a stable of nicely-appointed aircraft modeled by Jeff Jacobs. The "OB" stands for the moniker, "Old Bailey Aeroplane & Screen Door Co."

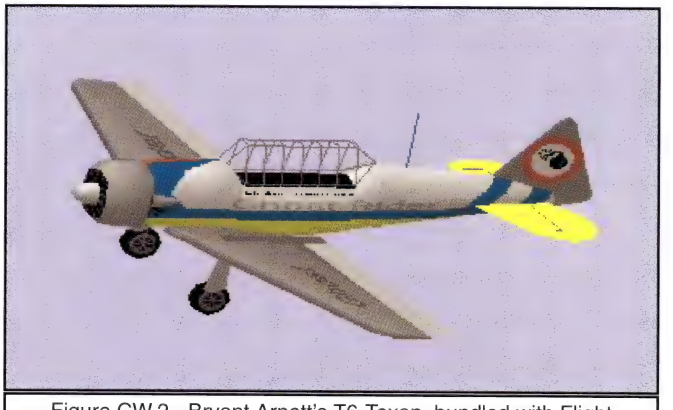


Figure CW.2 - Bryant Arnett's T6-Texan, bundled with Flight Simulator Flight Shop, is a classic model both for looks and performance—in the author's opinion... 'way ahead of its time.

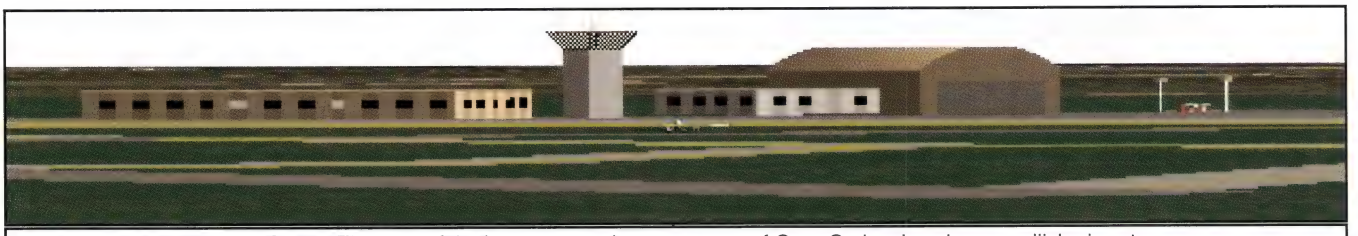


Figure CW.3 - The peaceful, almost pastoral scene at one of Greg Carlson's unique smallish airports. Carlson's Chicago2.Zip, available on CIS' FSFORUM, dresses up a number of default FS airports, too.

3) The OB-C172N (Figure CW.1) designed by another FSFORUM member, Jeff Jacobs. This is a handsome rendition of one of the most popular light planes ever, and I took to it, in truth, to wean myself from 1 and 2 above, which I'd been flying too much. I changed the flight model a bit to suit myself.

Next in order of my preference among the default aircraft is the Sopwith Camel, where again I didn't content myself with the stock model. Mine I call the Camel RC; it's modified for stunting (which I mostly do when simulating RC or radio control), and is painted a beautiful dark orange.

The Learjet, I virtually never fly. I haven't been able to modify it to suit my flying tastes, and there are several user-designed jets I much prefer (see below).

I like the idea of a glider or sailplane, and I think the default Schweizer 2-32 is a beaut. Still, for some reason I almost never fly it. I guess I'm too busy downloading supposedly gee-whiz planes and trying to evaluate thousands of square miles of scenery.

There are several good planes that came with BAO's Flight Simulator Flight Shop—at least they were good after flight model touchups provided either by the patch BAO issued for its program, or by "user flight engineers." One that needed no touchup, and is a favorite of mine, is Russell Mueller's ULIGHT.AIR. There are some situations where nothing can take the place of this nimble, highly enjoyable ultralight. I like Bryant Arnett's T6 Texan (Figure CW.2) very much, and think it was ahead of its time cosmetically; many planes designed now lack its fine detail and overall visual "believability." I could only wish for a pilot's head sitting in there. The Beech Baron is a good reciprocal-engine twin, but I rarely think of myself as a flying businessman, so I don't too often fly it. The Paradise DC-3, like the 747, in my view has been outclassed several times over with Dakotas and 747s designed by "outsiders." The Blue Angels version of the F/A 18 Hornet is one of my favorite jet fighters, although I fly only the flight model modification created by the multi-talented Chuck Dome.

Plethora

Let's see. I've already named enough airplanes to keep any owner busy for a lifetime, and I've barely left the default hangar. There are at least 20 other user-designed models I've tried and enjoyed—yet haven't flown enough to wring 'em out—and another 30 or 50 I've downloaded and haven't even unzipped! It looks hopeless. At least, it's obvious that if I'm going to keep things simple I have to narrow down my aircraft choices —drastically.

Then there's the above mentioned matter of scenery. Once I choose the aircraft (singular and/or plural) of the day, I must decide where on God's earth to fly it. Deep in the pit of my stomach I feel I'm missing out terribly on great scenery to fly in. I have such scenery—choice spots all over the U.S., from Joel Church's northern NY state to Robert Shisler's Pennsylvania to Alan Misiaszek's Maryland, DC and Virginia to Bill Otten's Florida and—well I could go on and on. All that great scenery is right there in my Fltsim5/Scenery directory. But I'm not getting to it—at least, not fast enough to have a clean slate for downloading the *next* masterpiece. Arggh!

So, as aforementioned, I've decided something should be done about the situation. And here's what I'm proposing to myself - re: aircraft, I will limit myself to just one each of the following 10 types:

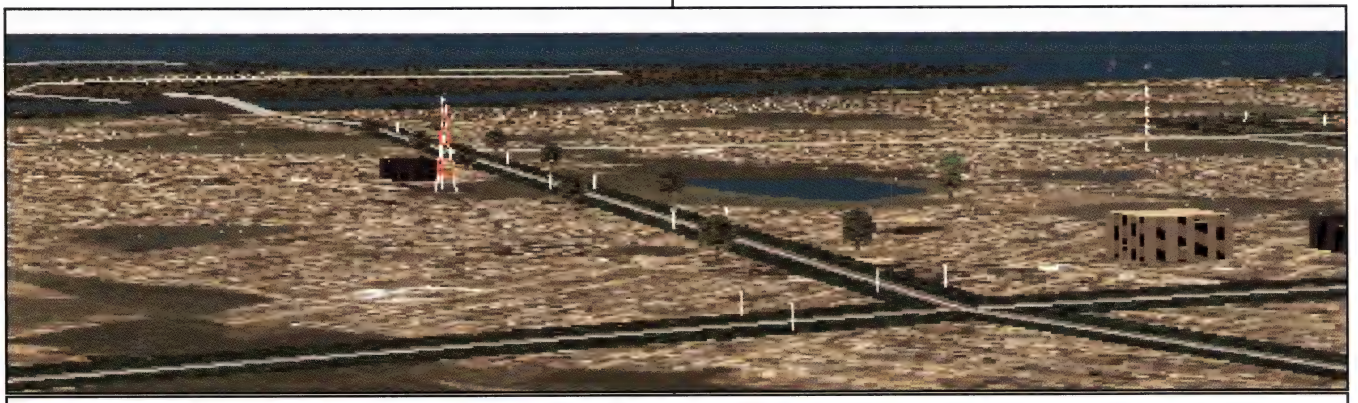


Figure CW.4 - A sample of the beautiful Savannah, Georgia area modeled by the team of William Boney and John Longworth. Note the fine detailing of roads and lighting, and the numerous artistic touches.

Ultralight - The default Ulite
Old-Time Stunter - (Still deciding, Stearman or Camel RC)
SEL Fixed Gear - Jeff Jacobs's 172—beautifully modeled
SEL Retractable - My Power182
Twin Bizjet - T310R (Steven P. Joens)—great appearance
Military SE Prop - PC-7 (Ken Kerr) or T6-Texan
Military Jet - NASA T-38 (Paul Hartl) Hottest I know!
Futuristic Fighter - EF2000 (Juergin Timmer)
Airliner - Possibly Lockheed Electra—haven't decided
New download - Slot for flight testing new models

When a "new download" appeals more to me than the chosen one of the same type, I'll switch—that's all. I can always switch back. And I can always temporarily put any other plane in any slot, replacing the one that's there. But if I keep the count to 10, I'll feel like I'm sort of in control—wouldn't you say? And certainly 10 airplanes aren't too many for a man of my great wealth. (Snicker.)

Making the Scene

Now to scenery. Some of the user-designed scenery is absolutely great—in particular those that use Peter Jacobsen's SCBUILD to underlie everything. SCBUILD is a program that takes government maps and converts all the roads, lakes and rivers on them to digital information scenery designers can use. Don't ask me how. But the result is that you can fly VFR beautifully over such scenery—in the IFR1 mode (I Follow Roads) or IFR2 mode (I Follow Rivers), or even ICL mode (I Check Lakes).

Roads, lakes and rivers (along with mountains, of course) are at the heart of VFR (Visual Flight Rules) flying. There's nothing quite as confidence-building as finding a charted lake exactly where you expected to find it. When I was flying the Cessna 150, I'd sometimes use the actual shape of a lake as verification that I was heading in the right direction. As SCBUILD becomes better known, more and more designers are using it. So I've decided that for now, I'll limit my scenery additions to that of large areas which use SCBUILD as a base. The latter, by the way, does not develop airports and/or cities—again, don't ask me why—but just terrain features, so designers need to add those things using their own talents and the various excellent scenery designers and compilers which are available.

Still (I tell myself), if I limit my scenery to SCBUILD-based areas, that rules out some very, very favorite scenery designed before SCBUILD, for example the Chicago2 scenery of Greg Carlson. His typical airports (Figure CW.3) look and *feel* more like typical airports than anything I've seen or felt in Flight Simulator, and are full of nostalgia for me (a typical-airport buff if ever there was one). Limiting myself to SCBUILD scenery also rules out all European scenery, for there is no SCBUILD yet for Europe. And I happen to like the commercial Europe-1 scenery very much, not to mention that of numerous other world areas.

It seems as if the problems I mentioned at the outset—the rate at which user-designers are producing great airplanes and great scenery—lends itself to no easy solutions if, like me, you don't want to miss anything really outstanding. There's so much that's outstanding! Worst of all, I think lately the stuff that's backing up in my FS directory is slowing my computer down. It seems to get slower every day, as if it's weary of trying to search the globe for some obscure airport I ask for, or search a hundred factories for a specific airplane I think I'll take up for a test flight. That red light that says "hard drive activity" seems to burn longer and harder than it ever did—even on my Pentium 100. Of course, nowadays a Pentium 100 is a slouch, I guess—but for a week or so after I bought it… it was leading-edge!

Occasionally I think I'll do something drastic like erase *everything* and start all over again—maybe just two airplanes and three airports. One airplane for Sunday flying, like the 172, and one for really stimulating (scaring?) myself, like the Blue Angels' F/A-18 Hornet or the EF-2000. While for airports, I'll simply choose three from Chicago2; or perhaps 3 from Joel Church's New York State scenery; or maybe just narrow it down to one "home" airport, say in the incredible Savannah International area (Figure CW.5) created by William Boney and John Longworth, and make that a base for *all* flights, i.e. Savannah is A and everywhere else is B. Or, seeing how beautiful Savannah is to approach day or night, maybe Savannah should be B and anywhere/everywhere else A? And if I remember right, Savannah doesn't even have the advantage of SCBUILD!

End of the Tunnel

Well, there's still hope for me. As I write this, the advent of Flight Simulator for Windows 95 (we're calling it "FS6") is slated for November 7 or 11 or thereabouts. So why should I knock myself out now solving an insoluble batch of problems? I see there'll be a new aerobatic plane bundled with this new version. That could become my favorite plane of all, and I could concentrate on flying it just *excellently*, hmm? And FS6 is supposed to have some cities with more flesh on their bones. Maybe I could choose one that I know personally, like New York, and make that my base (heck, I've never even *seen* Savannah real world).

And, furthermore. There'll be other new flight sims coming out at about the same time—one called "ProPilot" from Sierra, and an upgraded version of ATP from Lago, and a non-military chopper from Maxis, and a new version of Red Baron, etc. etc... on into 1997. You see, I keep up to date. I read MicroWINGS as well as write for it ☺.

So that settles it. My best strategy is simply to wait, and do nothing. There'll be new worlds to conquer and new problems to solve with all those new sims. And I can cross those bridges when I come to them. (Er... can't I?)

About the author - Charles Gulick is the author of six books on the various versions of Flight Simulator, the "Fly" series of situation disks, and the recent "Vectors" adventure set for use with Flight Shop. Charlie can be reached on CompuServe at ID [71241, 321]. [MW✈]

The Science Of Simulations

Simulation and Your Senses

Many of you are building your own cockpit to make your simulations more true to reality. I have talked with many people on the varying aspects of their cockpit building adventures. Except for very few, such as our fearless leader here at MicroWINGS, few go on to complete this sometimes overwhelming project. Understanding the roll and importance of each of the senses of sight, sound and, feel can make a more realistic cockpit for you to fly. To make a simulation realistic, all we need to do is to fool the subconscious mind. Even when we know that it is fake, the subconscious will prevail in convincing us that it is real. This article will describe the part played by the various senses such that you can optimize your cockpit building or just plain simulation flying!

Simulation is a collection of illusions. The holographic bird found on a credit card appears to be three dimensional. You see a solid bird in the card even though you know that the card is flat. Much research has been done studying how we sense the real world and how to fool those senses. Professional simulators apply this knowledge extensively to provide the illusion of flight. To accurately fool so many senses requires an expensive collection of hardware that is designed to stimulate our senses just enough to have our minds say that it is real. Unfortunately, not many of us can afford their own professional simulator but, we can do better than flying from the keyboard. It is possible to enhance the simulation such that it is closer to the real thing. We do this by fooling the subconscious mind. Even though not perfect, it is definitely better than nothing at all even if we only fool part of the mind.

Visuals

Sight is the most important and is the effective sense. The out the window display is usually the last thing home cockpit builders consider. With professional simulators, it is the first as well as the most expensive. We will look at this first. This is because sight is the by far the strongest method to fool the mind that something is real. In fact, by sight alone, a person can be easily fooled that they are moving when they are, in reality, motionless. Studies have shown that pilots in professional simulators will react to what they see as if it were truly happening. I have found myself in professional simulators leaning into turns, getting butterflies in the stomach and, grabbing onto the seat to make sure I did not fall. All this when I was not moving and all this caused by sight alone! However, to experience this level of immersion into the simulation requires that the display have a large field of view. Typically, this would have to be greater than 80 degrees horizontal. Unfortunately, current CRTs, projectors and, head worn displays that the home builder can afford do not come close to having this large of a field of view. Typically, they are less than half.

So, you cannot get the ideal field of view in your display. However, you can make an out the window view more realistic with a little planning. Using a Fresnel lens type setup or an HMD is better than just staring at a monitor. Both provide the simulated outside world at a distance much the same way it would be in the real world. To look at the out the window scene on a monitor 2 feet away from you repeatedly tells your subconscious that it is not real. The suggestion to the mind comes from the muscles of the eye. Any time the muscles are contracted, the mind knows that you are looking at something close. When they are relaxed, you are looking at something far. A Fresnel lens and HMD provide the image at a distance as it would appear in the real world. Careful planing before building your cockpit will show where and how big you window to the world will be. Additionally, playing around with the display hardware you intend to use before construction will make your expectations realistic rather than the proverbial "pipe dream."

Sound

It is the easiest portion of the cockpit to work. High fidelity is key. If you are putting effort into making a cockpit, put some effort into the speakers that reproduce the sound. Volume comparable to the real aircraft will help greatly as well as a sub-woofer to help with the feeling of aircraft vibrations. The volume and range of frequencies (tones) that are in engine noises help in the immersion to the simulation. What happens is that the frequencies and volume of the noises stimulate the mind such that spends a great deal of time processing the information. It forces one to concentrate harder to perform the same task as without the noise. The mind's processing of this information can be tiring. It is the same reason why falling rain is so relaxing. It forces the mind to concentrate on the noise that the rain makes. This means that if you are doing something complicated, such as flying a plane, your concentration becomes greater. In simulation, concentration equates to immersion.

Controls

Let's face it, it is rare to find a simmer that flies solely from the keyboard! It is a novelty to find one that flies from a mouse. Most of us fly from a yoke or joystick. Buying quality is a must. Cheap controls feel funny and will be a constant reminder that your cockpit is not real. Some have even integrated real grips into their cockpits such as our fearless leader here, again, RMM! The key is to

focus on those controls you touch most frequently such as the yoke, pedals and engine controls. Next, consider switches for gear and flaps as well as other aircraft controls. The EPIC controller (See R&R Electronics listed near the back of magazine in the Commercial Member Directory) is ideal for allowing you to use real switches in place of the keyboard. The cockpit like feel will help in reinforcing the immersion that is provided by the sights and sounds.

Enclosure

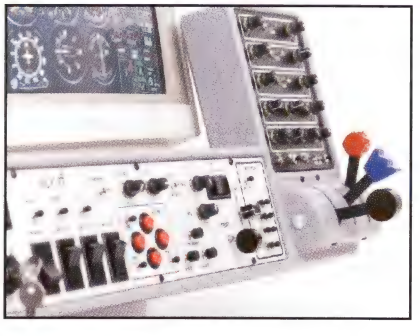
Consider the cockpit itself. It should ideally block out all light from the real world. Only the out the window scene, instruments and cockpit lighting should be the only light that you have. The same follows for sounds. Block out all of the real world leaving only the reality provided by the simulation. The immersion potential of your cockpit will be lessened if you are able to hear or see a TV, look about the room, look out a room window, etc. The cockpit should force all your senses to the simulation that makes easier the concentration on the simulation.

Motion

If it is a must, it should be the last consideration of your cockpit project. In terms of benefits home cockpit builder, it provides the least amount of added realism in terms of cost and complexity not to mention the effort to build. The biggest problem to overcome is synchronization between the out the window view and the motion of the base. This is difficult to do even with professional simulators without large costs. The synchronization is primarily lost from the time it takes for the motion base to respond to the signals presented to it. If you are considering one, remember this: If you can watch the motion actuators move from one position to another, they are too slow to be usable. Remember that your out the window scene on the PC will change more than 10 times a second. Your motion base should be as good.

Conclusion. Looking out the window is where you will give most of your attention. It is reasonable to place as much emphasis on the display as you can afford. Sound is the best reinforcement of what you see and is the cheapest to improve. Quality in your controls will reinforce that feeling of immersion. It is very important to block out the outside world to the cockpit. This prevents distractions and suggestions that your simulation is not real. But, the most important item for your home cockpit is the switch called the "call button." It is connected to a lamp that signals your spouse, a.k.a. flight attendant, to bring the beverage cart.

About the author - Tom Kopke is a research physicist in the area of training simulation technology, specializing in display systems. He can be reached on CompuServe at ID [70640,3205] where he is active in the FSFORUM. [MW✈]



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Review Of: Apollo's Europe II Scenery

Europe 1 gave us the ability to fly Holland, Switzerland, Austria, and Germany. The cybergraphic scenery and the detailed rendering of many famous airports, enhanced the experience to no end. Now, following on in this tradition, comes Europe II. Published by Apollo of Munich and programmed by the Alting brothers, Europe II offers France (including Corsica), Belgium, and Luxembourg. The included Jeppesen low altitude charts and approach plates will cater to the serious IFR pilot and dynamic scenery is available at most of the main airports. One nice touch is that when refuelling, a fuel truck pulls up beside the plane — I love it!

Installation of Europe II is quick and to the point. Four ready to fly situations, all in France for some strange reason, are offered and are quite a good introduction to the package. Note, that if you have Microsoft's Paris scenery add-on, it will be completely overwritten by Europe II (I believe a work around is available on the major on-line services and Internet ftp sites) and there is a compatibility bug between Europe II and Europe 1 version 1.0. An upgrade patch for Europe 1 is also available.

France - Starting in the culinary capital of the world, Paris is nicely represented here. While the detail is not as high as Microsoft's Paris, it is nonetheless a good rendering. A tree lined Champs-Elysees (minus all the cinemas) is lovely as are the landmark buildings scattered around the French capital. The night lighting of Notre Dame cathedral is absolutely beautiful. The Louvre museum with its glass pyramid (built during the Mitterand presidency) and l'Arche de la Defense are two of the more unusual items you might like to see. The buses at the foot of the Eiffel tower are also good. At the airports themselves, runway direction indicators make finding your way around a bit easier (yes, I believe even real pilots get confused) and the glass in the control towers is transparent. Towns and cities along both the Atlantic and Mediterranean coasts are a joy to fly over. Ships in the harbors, sailboats, and dock cranes for unloading are all there, with the usual complement of red tiled roofs and electricity pylons in or around the airports. Military airports are included and many military airfields have runway length markers alongside. The Pyrenees are well drawn and not only are they a natural barrier between France and Spain, but they are also used for low level high speed training by the French Air Force. When flying cross country there is not a lot to see, so confining yourself to the major cities and coastal regions is my advice, if you like to do a bit of sightseeing.

Corsica is a mountainous island of the south coast of France, popular with tourists and a training ground for the French Foreign Legion. Flying around the island, I pity anyone having to do any sort of training in those conditions. Bastia to the Northeast and Ajaccio to the Southwest are the two main airports on Corsica.

Luxembourg - The Grand Duchy of Luxembourg is a small state, 998 square miles (2,586 square kilometers) noted for its banking centre (the third largest in Europe) and the parliament of the European Union. Its population of 373,000 people is well served by Luxembourg international airport, the only airport included in Europe II. After touring around the city of Luxembourg, I flew northwards, following the course of the Sure river. This eventually leads to the slopes and valleys of the Ardennes forest and it is a pleasant flight to make.

Belgium, well represented here with 30 airports, military and civilian, offers a wide choice for flight planning. Brussels is the capital city and its political importance within Europe as the nerve-centre of the European Union makes for a very busy airport. As is common throughout Europe II the 30 airports depicted are well designed. While in Belgium, a trip

Figure E2.1 - l'Arche de la Defense.

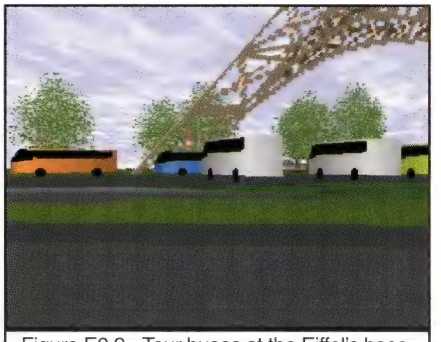

Figure E2.2 - Tour buses at the Eiffel's base.

Figure E2.3 - Another exquisite bldg in E2.

Figure E2.4 - Notre Dame's bell towers.

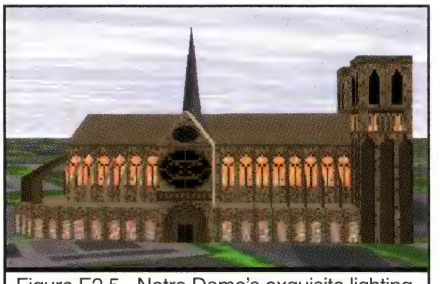

Figure E2.5 - Notre Dame's exquisite lighting.

around the port of Antwerp is essential. This is one of the busiest trans shipment ports in Europe. The color of the ships in harbor stands in stark contrast to the surrounding greenery and the loading cranes beside the ships seem ready to swing into action.

Flying due south from Ostend (a busy ferry port between England and Belgium) over the rolling plains of Flanders one can only be reminded of the savage fighting that took place here during both world wars. Indeed Napoleon was defeated by Wellington at Waterloo in 1815, which is located a short distance due south of Brussels. The principle towns and cities of Belgium are there to be flown and a trip from Liege in the east, to Brussels in the center, to Antwerp in the north, finishing at Ostend in the Northwest makes for a pleasant evening's flying.

A Bridge Well Drawn

There is nothing more spectacular when following the course of a river than to find oneself staring at a bridge directly ahead of you. There are many fine examples of well drawn bridges in Europe II, among them, the Pont du Gard near Nimes and the Pont du Normandie in France. Also check out the bridges near Brussels airport. Sadly I could not locate the Pont D'Avignon, famous in children's songs and of which, in reality, half of it is missing.

Europe II is a pleasant place to fly, I personally love the patchy green fields and the coastal scenery on the west coast of France. Because the density of scenery, around the cities and towns, is not as high as with other add-ons, Europe II will not kill your frame rate. Some people prefer massive detail when flying, while others are happy to navigate with just enough outside scenery to make the flight pleasant. Europe II offers a good combination of both. While the terminal at Charles de is realistic enough, I noticed that the terminals at Toulouse Blagnac and Lyons Satolas were not what they are in reality. Toulouse Blagnac has the terminal building in the shape of an aircraft's fuselage and is rather unique, while in Lyons, it looks a bit like the Sydney opera house from a distance. Both these airports I have visited recently. This might be a moot point, but I feel that it would be nice if the terminals at the major airports resembled the real world. Europe II is well packaged but for the lack of a jewel case for the CD ROM. For enthusiasts with smaller hard disks who use the CDROM caching facility, a jewel case is absolutely necessary for safe storage.

Summary

Europe II is a worthwhile addition to anybody's collection. It covers a wide area of western Europe and one can only wonder what we will see in Europe III. I really liked Europe I and I am enjoying Europe II. I hope you do too.

About the author - John McNeely is a service engineer living near Dublin, Ireland. He is a flight simulation enthusiast, participating in the local PC Pilots Of Ireland flight sim club and is a frequent contributor to PC Live Magazine. [MW✈]

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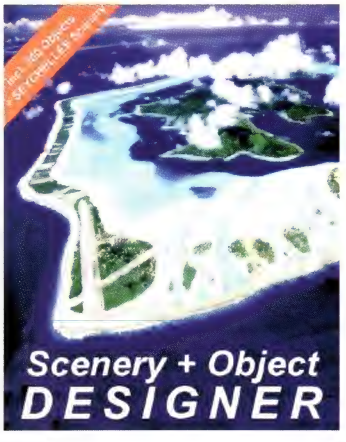

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Preview of...

Microsoft's Flight Simulator for Windows 95

Flight Simulator Turns 95

How do you spell excitement in the Windows 95 operating environment? Until now it was difficult, but after November 7th, it will be easily spelled out as F-l-i-g-h-t—S-i-m-9-5!

Microsoft's line of flight simulation products will soon have a new member: Flight Simulator for Windows 95. An evolutionary step beyond Flight Simulator 5.1, FS95 is faster and easier for the novice to use, yet includes enough new features to keep die-hard pilots interested. Microsoft has incorporated FS95 completely into the Windows 95 environment, enhancing its user-friendliness and compatibility.

What's New?

No release of Flight Simulator is complete without tons of new goodies to play with. FS95 includes more aircraft, scenery, and options than its predecessor. In addition to the standard Cessna, Learjet, Sopwith Camel, and Sailplane; FS95 features a Boeing 737-400 and Patty Wagstaff's aerobatic Extra 300S. Accurate panels with lots of functioning instruments and switches accompany the new planes.

The B737 cockpit features a glass-cockpit Attitude Indicator with digital speed and altitude tapes, accurate engine instrumentation, and a Horizontal Situation Indicator. The HSI is a more sophisticated version of a standard VOR/ILS receiver. It intuitively displays the relative positions of aircraft, radio beacon, and desired flight path in a graphical format. With the extensive autopilot controls, you can dial in an altitude or course holds without touching ever using the menus.

Figure FS95.1 - The new Opening screen lets you choose where to dive into the new Flight Sim for Windows 95.

On the Extra 300S, you'll find most of the standard instruments with the addition of a few specific to aerobatics, such as the G-force indicator. Pressing the TAB key will cycle through printed cards diagramming some of Wagstaff's own aerobatic routines.

However, in our tests, FS95 (even as a beta) is easily running more than 50% faster than FS5.1 under similar display option settings!

Scenery has not been neglected, either. Tokyo, New York, Paris, London, and Las Vegas, previously available only as add-ons, are now rolled into FS95. Microsoft has also added some new

Figure FS95.2 - FS5.1's situation files are now called 'Flights' and may even be chosen at random with the 'Surprise Flight' option.

Figure FS95.3 - The Entertainment section lets you fly Flight Shop style adventures or try to make it through pre-designed challenges.

Figure FS95.4 - New on-line Airport/Facilities Directory (A/FD) features point and click, 'drill-down', style access.

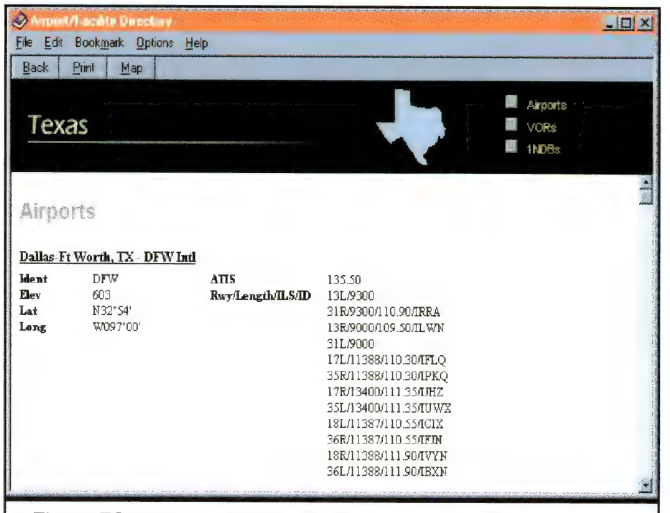


Figure FS95.5 - A portion of the contents under Texas, Airports, DFW. The A/FD also has data on VOR's and NDB's.

photo-digitized areas: Lake Chelan, in the mountains of Washington State and a new, stunning, rendition of Martha's Vineyard. All of FS5.1's World Scenery is still there as well as a slew of new areas. Most third-party scenery add-ons will also work without any modifications. Commercial add-ons, such as MicroWINGS' Dallas/Fort Worth scenery package, are also compatible with FS95.

Easier

Microsoft has gone all-out bringing Flight Simulator into Windows 95's standard interface. The entire menu system has been overhauled. Now FS95's menus feature a cleaner interface and a slick, panel-like appearance. Windows' "ToolTips" feature displays the names of instruments and switches as you move the mouse around the cockpit.

Figure FS95.6 - Multimedia enriched on-line help and reference manuals make FlightSim95 very easy to learn.

FS95 comes with several massive on-line references. There is computer-specific help on setting up and flying Flight Simulator, a multimedia Pilot's Help handbook, and an Airport/Facilities Directory. Pilot's Help includes detailed information on each aircraft, checklists, and thorough private pilot, IFR rating, ATP pilot, and aerobatic courses. You can find clear, well-written material on everything from fog formation to turbine engine operation. Some points are illustrated with a pictorial diagram or video. The Airport/Facilities Directory contains airport information, navigational aids, and frequencies by region, especially handy when you're flying IFR and don't want to dig out all those charts and approach plates.

Microsoft's efforts to bring flight simulation to a broader audience, will help new users get in the air more quickly. Several flight lessons, complete with digitized comments from the instructor, introduce novice pilots to flight procedures. The

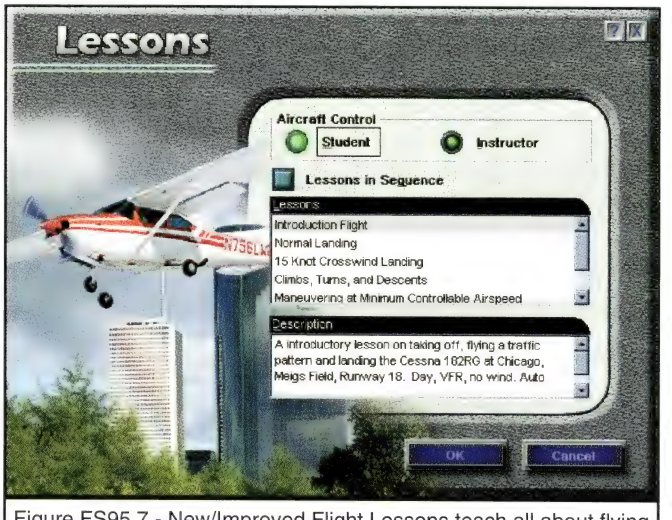


Figure FS95.7 - New/Improved Flight Lessons teach all about flying to the beginner and serve as a good refresher for seasoned users.

Figure FS95.8 - The Patty Wagstaff Extra-300S looks and behaves very much like the real thing, complete with a new cockpit panel.

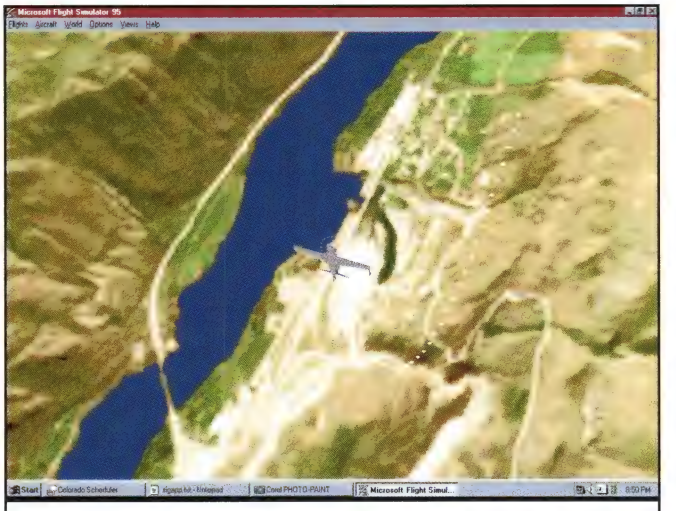


Figure FS95.9 - Here the Extra 300S begins an inside square loop, rising above the river gorge near Lake Chelan, Washington.

"Entertainment" options, which until now have barely functioned, include many flying challenges with graded difficulty levels and Flight Shop-style adventures. A converter for Flight Shop aircraft and adventures is planned for release shortly after the launch of FS95. The new menu system allows users to make "Flights" with preset location, weather, etc. quickly and easily. (As an interesting side note, Microsoft appears to change the name of saved files with each new version: FS4 called them "modes," FS5 had "situations," and now FS95 features "flights"). For those that like to be surprised, there is now also a 'Surprise Flight' option that will select a flight for you at random!

Better

FS95 corrects many bugs left over from FS 5.1, including the ability to support (correctly!) runways that have the same ILS frequency for both ends of the runway such as 17L/35R and 18R/36L at DFW (Dallas/Ft. Worth). Now, virtual airlines and flight sim users can make southerly ILS approaches into the MicroWINGS DFW scenery!

A major enhancement has been in the depiction of roads and rivers through out FS95's scenery. Users of desktop panels and full size cockpits that use the EPIC board from R&R Electronics will be happy to know that their EPIC boards will still work. Some EPIC software may need to be updated to take advantage of some of the new and/or changed keyboard functions.

In addition to more new scenery, even the default sceneries have been made better. As an example, downtown Chicago (when scenery is set to Very Dense) now has so many buildings in it, that you can not see any background scenery through gaps in the buildings (as you could in 5.1)!

More Realistic

When Microsoft first acquired BAO's Flight Simulator code and their programmers, and brought them in-house, many feared that Flight Simulator would be headed away from realism and more towards the gaming market. Those fears have been put to rest with FS95 and with recent agreements signed between Microsoft and Flight Safety International - one of the leading pilot training organizations in the world, with flight training locations across the world.

Figure FS95.10 - The very familiar Learjet flies over a very new, photo-realistic rendition of Martha's Vineyard.

Figure FS95.11 - The new Boeing 737 airliner and it's very realistic, glass panel cockpit (complete with a very good HSI instrument).

Under the agreements, Flight Safety will be working closely with Microsoft to help test the flight modeling, provide realistic training content, and additional yet-to-be announced add-ons to FS95. In fact, Flight Safety is currently running a pilot (test) program at its facilities in Vero Beach. There, half the class is using Microsoft Flight Simulator as part of the curriculum and the other half is using the traditional curriculum. Results so far indicate a ***very*** noticeable, favorable impact in training, transference of knowledge, and learning efficiency. Flight Safety will be using Microsoft Flight Simulator in more and more training curriculums based on the results of this pilot program. A report on this and what Flight Safety expects for the future with regard to Flight Simulator will be made at the MicroWINGS conference by the Project Manager of this program at Flight Safety.

Faster

Perhaps the best new features of FS95 are support for Windows 95's huge driver library, Plug 'n Play, and DirectX technology. Users who cringe at hearing "IRQ," "DMA," or "resource conflict," will suffer no more. FS95 allows Windows' auto-configuration to fix 99% of those nasty problems.

Considering that FS95 is a graphically intensive application, running with all the overhead required of a Windows 95 program, FS95 delivers amazing performance, even when running in a window with other programs in the background. The beta used for this preview was tested on a Pentium 166 and a DX/50 (upgraded to a DX4/100). There is a noticeable difference (as would be expected) in FS95's performance on these two ends of the PC computing power bandwidth. However, in our tests, FS95 (even as a beta) is easily running more than 50% faster than FS5.1 under similar display option settings! On the 166mhz Pentium, 5.1 ran at 9.0 Frames Per Second (fps) with max options and 18.0 fps using the default startup. FS95 has boosted that number to 13.6 fps with max options and a whopping 27.7 fps using the default startup! We also tested FS95 running in different size windows and as a full screen windows application. The frame rate in those cases did not change. There is a small hit in performance if you run your windows at anything higher than 256 colors (about a 10% degradation running HiColor - 16bit mode). However, the Windows 95 web site has a free utility that allows you to switch color resolutions in Windows 95 on-the-fly, i.e. without having to reboot your system.

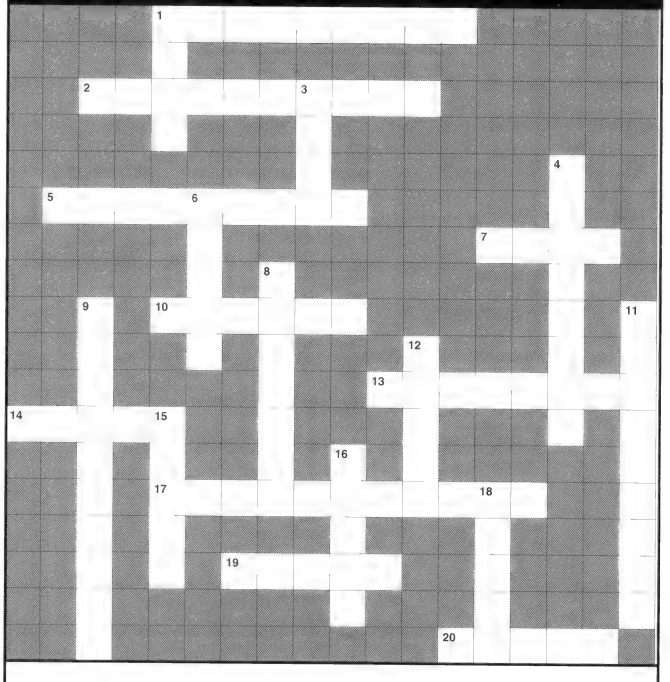
FS95 runs in a completely resizable window at any resolution (Yes, even 1600x1200 for you Pentium Pro/266 users - although the effective resolution is 640x480). For a better look, a new menu option allows instant, automatic switching to 640x480 full-screen resolution during flight. With the performance gains PCs have experienced since the release of FS5, owners of today's mid-range computers will now be able to fly with most options turned on and still enjoy reasonable frame rates.

New graphics cards with powerful hardware 3D acceleration are already on the market, and promise to deliver a quantum leap in performance at low cost. FS95 does not support any acceleration hardware at present, but look for future products to utilize 3D cards.

Because of the advances in hardware speed since FS5 first appeared, new features, and a revised interface, FS95 delivers a much better flight simulation experience than was ever before possible on a home PC. I recommend beginning pilot and experienced flier alike to go and try it out.

About the author: Dan Maas is a longtime flight simulation enthusiast in upstate Ithaca, New York. He has beta-tested numerous simulation products and addressed several MicroWINGS conventions. In the future, Dan hopes to enter the simulation or computer graphics industry. [MW✈]

Flight Simulation Crosswords

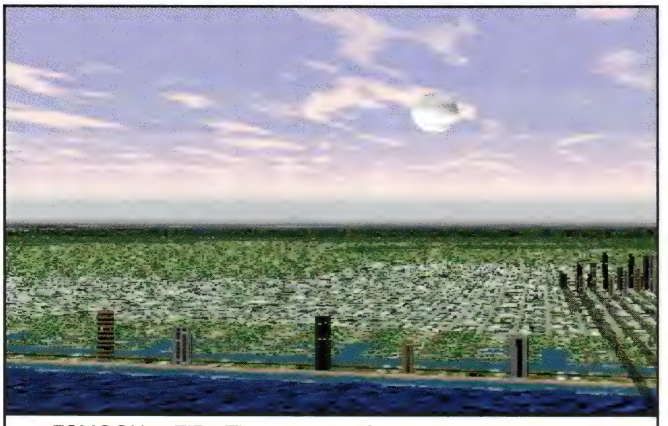


ACROSS

1 The T in ATP
2 Usually about 3 degrees, used for approach
5 The D in ADF
7 The front of an airplane
10 More than one pilot
13 Developer's of ATP scenery (see adv.)
14 An acronym used by Thrustmaster and fighter jocks
17 The 'Under The Hood' column is about flying on...
19 H in the aviator's communication alphabet
20 The R in IFR for a VFR pilot

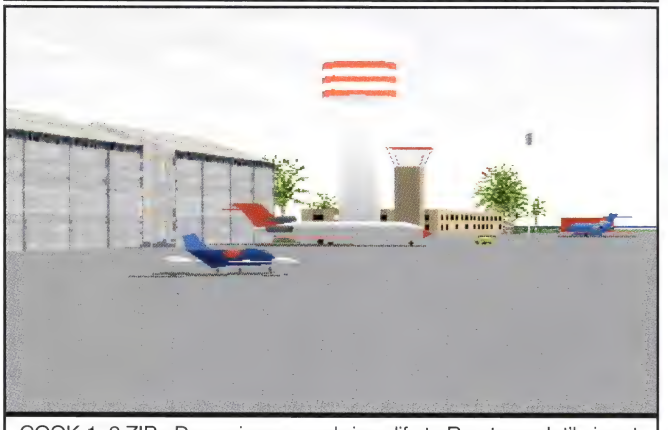
DOWN

1 The rear of an airplane
3 A lake in Spanish and the name of a MW Commercial member
4 The body of an airplane
6 The interior of an airplane
8 Where we all would like to have the left seat
9 The I in ILS
11 Measures left/right drift from course during approach
12 A term used by Aviation Teachware to name/describe their sim
15 The topic of this issue's Flight School
16 The R in IFR for an IFR pilot
18 T in the aviator's communication alphabet

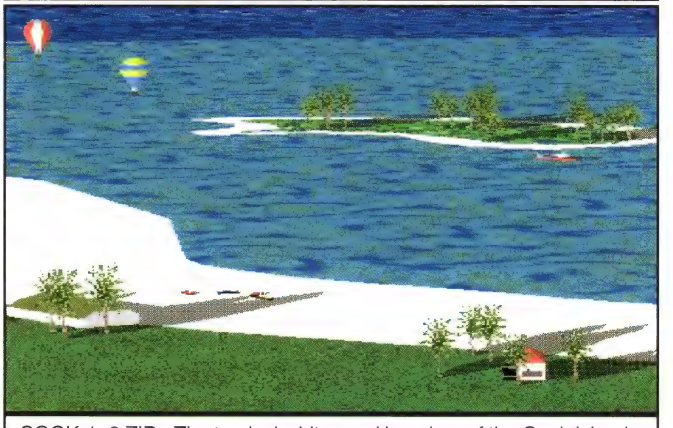


FSMOON11.ZIP - The moon in FS5.1 never looked so real.

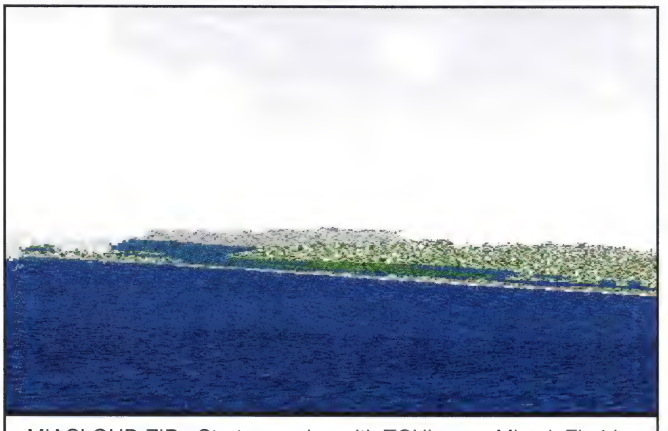
BEST4002.ZIP - The most accurate 747-400 Flight Shop models.



COOK-1_2.ZIP - Dynamic scenery brings life to Rarotonga Int'l airport.

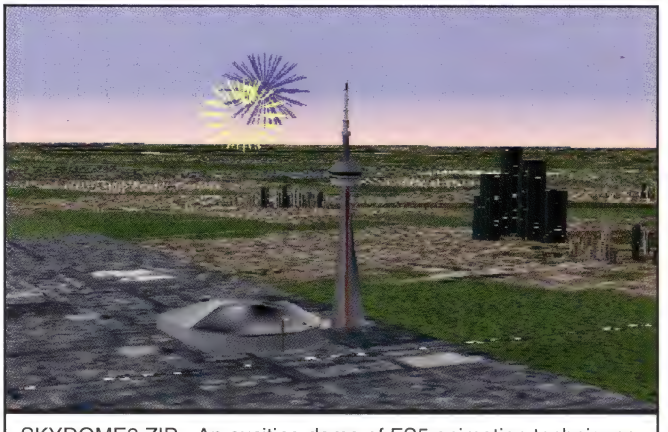


COOK-1_2.ZIP - The tropical white sand beaches of the Cook Islands.



MIACLOUD.ZIP - Stratocumulus with TCU's over Miami, Florida.

RF4E198.ZIP - Israeli Air Force RF-4E reconnaissance jet.



SKYDOME2.ZIP - An exciting demo of FS5 animation techniques.

US_VT01.ZIP - Textured mountains and detailed airports in Vermont.

THE PILOT SHOP

Hot Download Files For Flight Sims

(pictures on prior page)

A note about location of files - The locations listed in this column indicate a confirmed source, but they may usually be found at other web sites or on-line services such as CompuServe, MSN, or AOL.

FSMOON11.ZIP (Bytes: 35kb)

Author: Jorge Santoro
Location: http://ourworld.compuserve.com:80/homepages/fsa

If you like customizing FS5.1 to simulate current real-world conditions, or if you're just bored with the never-changing crescent moon provided by Microsoft, then FSMOON was made for you. After a simple installation process, start FS5 as usual. During startup, FSMOON will read your current system date and replace the standard moon with one showing the actual current moon phase. This program is e-mail-ware: If you use it, just send Jorge a brief message telling him what you think of FSMOON and what country you live in.

BEST4002.ZIP (Bytes: 344kb)

Authors: Juan Cabeza and Sean Trestrail
Location: http://wings.ark.com/ (fs5 page, FSFS A/C button)

This is an update to the popular BEST400.ZIP from a few months ago. It is a collection of four Boeing 747-400's of British Airways, QANTAS, KLM, and Northwest Airlines, but it is also much more. First of all, the flight models have been tuned to the highest degree of accuracy possible with the assistance of Sean Trestrail, a QANTAS 747 pilot. Also, the visual models have been improved over the original 747 that was included with Flight Shop. Enhancements include: leading edge slats, spoilers, lit cabin windows at night, 3-dimensional flaps, improved undercarriage and better simulated metallic textures for the engines. These models also employ realistic fuel flow scalar values for the patched version of Flight Shop. On top of all that you'll find a thorough technical description of 747-400 flying procedures and the most detailed and useful operating instructions included with any Flight Shop aircraft to date.

COOK-1_2.ZIP (Bytes: 319kb)

Author: Cozzi Dario
Location: http://wings.ark.com/ - fs5 page, Scenery button

This is a beautiful rendition of Rarotonga and Aitutaki, the largest of the Cook Islands in the South Pacific. This scenery features Rarotonga International Airport and Aitutaki Regional Airport which are complete and detailed down to the palm trees, giving a truly tropical feeling to your visit. The dormant volcanic peaks on the islands are comparable in quality to the MS Caribbean and Hawaii sceneries and there are coral reefs, outlying islands and tourist resorts to explore. You won't feel alone here, either. The scenery includes extensive dynamic elements and even a Flight Shop Adventure file to help find the islands. The Cook Islands make a pleasant stop on a trans-Pacific flight or a diverting locale for some VFR island-hopping.

MIACLOUD.ZIP (Bytes: 98kb)

Author: Jorge Moreyra
Location: http:wings.ark.com/ - fs5 page, Scenery button

The default clouds in FS5 have been described as having the appearance of "piles of ice cubes", and they don't necessarily conform accurately to local conditions. Jorge Moreyra has created a series of 3-dimensional cloud sceneries for various world-wide destinations, including Miami, New York, Hong Kong, Atlanta, Mexico City, Nassau, and San Juan. These clouds operate independently of FS5 weather because they are actually scenery elements so you'll want to increase the turbulence in the weather menu to get the full effect. Flying through them, or navigating "the footless halls of air" between them gives a wonderful sense of speed and freedom to the FS5 flight experience.

RF4E198.ZIP (Bytes: 142kb)

Author: Michael Gurezka
Location: http://wings.ark.com/ (fs5 page, FSFS A/C button)

Surely one of the most difficult paint schemes to create in Flight Shop is a military camouflage pattern, but when done properly, few aircraft are more impressive. Michael Gurezka has provided us with a stunning example of what is possible with his Israeli Air Force RF-4E Phantom II photo-reconnaissance jet. The visual model is complete down to the camera windows, night formation lighting, and sidewinder missiles. The flight model allows one to experience the thrill of low-level flight at Mach-1+. Give this one a try on your next mission.

SKYDOME2.ZIP (Bytes: 92kb)

Author: Garry Flynn
Location: http://wings.ark.com/ - fs5 page, Scenery button

Here's a novelty scenery demonstrating some of the animation possibilities of FS5: A fireworks show at Toronto's CN Tower and Skydome stadium. There are several lively examples of animation in this scenery, (including moving traffic along Lakeshore Boulevard, opening and closing Skydome roof, and a small formation of Canada Geese), culminating in a spectacular fireworks show at dusk. You can even parachute from the CN Tower observation deck and try to land inside the Skydome using the included FSFS parachutist and situation file.

747_4UPD.ZIP

Author: Juan Cabeza
Location http://wings.ark.com/ - fs5 page, Panels button

This is an update to the file, 747_4PNL.ZIP which was featured in this column in MicroWINGS Vol. 4 No. 1. Juan Cabeza has corrected minor flaws and improved on Doug Stracner's exceptional 747-400 instrument panel and has uploaded the result with Doug's permission.

US_VT01.ZIP (Bytes: 372kb)

Author: Kevin Plant
Location: http://wings.ark.com/

This scenery includes extensive roads and waterways as well as the well-known scenic hills. Watch those MOCA's and MSA's when flying IFR here! The major airports are well detailed with textured taxiways and buildings. Even the navaid antennas can be seen. An excellent example of what can be achieved using the some of the many freeware scenery design tools that have become available recently.

About the author - Eric Mitchell is a web site designer, aviation artist, and former Maritime Patrol Navigator who enjoys flying Flight Simulator 5 as well as designing Flight Shop aircraft and scenery. He maintains the wings.ark.com web site and introduces some of the newest and most interesting files in this column. Eric can be reached via e-mail at mitchell@mars.ark.com.

If you do not have a modem... MW can provide you with whatever files you are wanting (provided we have the author's permission to distribute their files). Contact us via tel., fax, or mail for file availability, ordering information, etc. For this service, we charge $5 per disk (USA) or $8 per disk (Int'l). Note that this is a per disk charge, not a per file charge. A disk is a 3.5", 1.44 MB floppy. If more than one file will fit on one disk, then you only pay for one disk. *[MW✈]*

COMPUSERVE Your Electronic FBO

by Greg Hannigan

FLY-IN, FLY-IN

May 4th was finally the day to breath a long-awaited sigh of relief. Several months of planning, preparing, designing, debating, and rehearsing were finally going to result in the event we were working towards - CompuServe's FSFORUM Fly-In #11, to Las Vegas, Nevada!

It was early in January when we had finally re-assembled our Fly-In Planning Team, hoping to work together towards a common goal - an FSFORUM Fly-In the likes of which we'd never seen before. We assembled a host of new ideas, flagged ideas from previous Fly-Ins that we thought we could re-work or improve upon, and set out to work.

Item number one was, of course, deciding on a destination. Michael Fisher, FSFORUM Associate Sysop and longtime Fly-In guru, shared with me the opinion that it was finally time to break free of the borders of the continental U.S. and set our sights on a European destination, but we thought it more appropriate to leave that up to the collective opinion of the Planning Team. So, after periods of destination nominations and voting, it was all set - we were flying, much to our surprise, to McCarran International Airport (LAS) in Las Vegas. Michael and I were seeking tea and crumpets or a deep, dark German brew, and instead we got Elvis impersonators, slot machines, and lounge lizards. Well, every cloud has a silver lining - at least we didn't have to figure out just what a crumpet was.

After destination selection was complete we still had a tremendous workload in front of us. There were decisions to make regarding which runway approaches to use, what STAR patterns to employ, and how best to make sure that the flight to Las Vegas was as accessible as possible to all. Past Fly-Ins sometimes brought complaints about the destinations we chose because pilots often needed to own commercial scenery packages in order to have runways to land on. This wouldn't be a problem in Las Vegas, as pilots could choose from either the commercial release of Las Vegas from BAO, the sparse default scenery from the CD version of FS5.1, or some very special scenery that we commissioned from Jim "JC" Crummy, one of the more talented scenery designers who frequents FSFORUM. Jim put those talents to the task and, along with a little help from fellow designer and forum member Ralph Zimmerman, came up with a beautiful rendition of McCarran. We shipped Jim and Ralph's work with our Fly-In 11 sign-up files so that all pilots could have an LAS airport to fly to.

I think that quite possibly the single biggest change to the FSFORUM Fly-In format that was implemented with Fly-In 11 was the introduction of MicroWINGS itself as a co-sponsor of the event. We got together with Robert MacKay, also the author of Flight Simulator Flight Shop's ATC Workshop and thus an adventure programmer extraordinaire, who put together a special custom adventure for us. Bob's adventure was used by Fly-In 11 pilots who had registered under our "IFR option" and who owned Flight Shop; it guided them from their entry point into their chosen STAR right down to the runway at McCarran. After the pilot touched down on the runway and began to decelerate, Bob's familiar voice came through their computer speakers: "Welcome to FSFORUM's Fly-In Number Eleven!"

Along with special scenery and a Flight Shop adventure, there were other "goodies" distributed to Fly-In 11 pilots. Every pilot who registered with us ran a special Windows-based program dubbed the "Registration Wizard". The Wizard guided them through the registration process, prompting them for each important data element that made up a Fly-In registration. The Wizard then collected and combined the data into a format that was imported or pasted into a CompuServe FSFORUM message and sent directly to the Fly-In 11 Planning Team.

Before running our custom MicroWINGS Fly-In adventure, pilots had the option of running a special Fly-In Adventure Editor. This Windows-based program helped pilots to customize the adventure file to their personal liking, specifying such

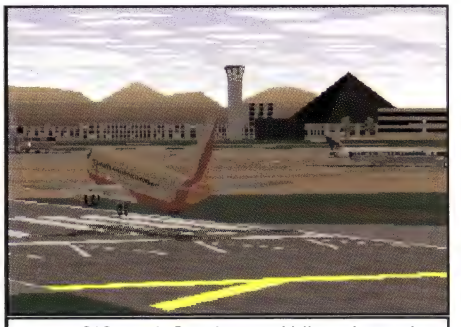


Figure CIS.1 - A Southwest Airlines jet makes it's final approach to runway 25R at McCarran Int'l Airport in Las Vegas for Fly-In 11.

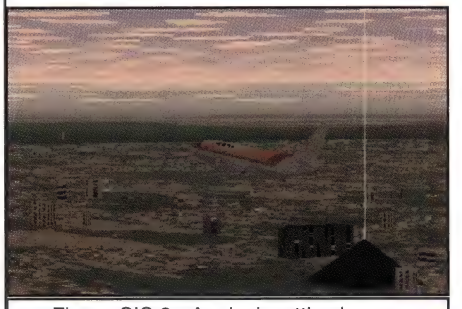


Figure CIS.2 - As dusk settles in over Las Vegas, some of our beautiful custom scenery is highlighted quite nicely.

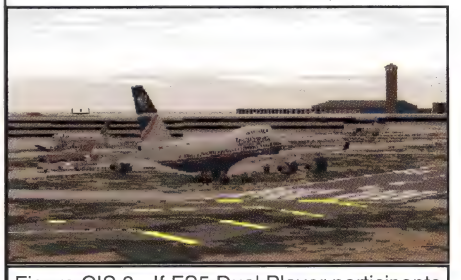


Figure CIS.3 - If FS5 Dual Player participants were able to view Flight Shop aircraft, this may well be what Speedbird 9 Delta Victor looked like as he made his landing at William B. Hartsfield's runway 9L.

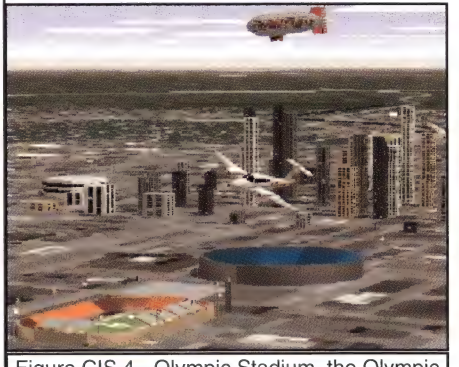


Figure CIS.4 - Olympic Stadium, the Olympic torch, and a special FSFORUM Fly-In 12 blimp were among the Easter Eggs that awaited pilots in Atlanta.

things as what airline/aircraft identification to use, which callsign, and whether the pilot wanted to hear radio hash signs played when being beckoned by ATC during their flight.

Fly-In 11 differed from past FSFORUM Fly-Ins in that, for the first time, we had pilots coming in on more than one runway at the same time. Those coming in under our VFR option were vectored into runway 19R, while our IFR pilots were split up between runways 25L and 25R. This necessitated a sophisticated air traffic control system, a specialty of our Fly-Ins.

As IFR pilots made their way through the STAR pattern of their choice, they were instructed by our custom Fly-In adventure to contact their approach facility when they reached the proper point. The approach contact told the pilot which control tower to call for an FS5 Dual Player landing when they reached their Final Approach Fix. After that, it was simply a call to their Fly-In tower that brought their flight to it's conclusion.

When all the planning and decision making came to a close, we released our Fly-In 11 sign-up files, making them available for download to FSFORUM's members in the forum's Library 14 (Fly-Ins & Rallies). The response we got was *incredible!*. Before Fly-In 11, we'd never gotten more than 30 or 40 participants at any one time, but we were now topping off with a total of more than 100!

And so, when the Big Day came, we tower operators "climbed into position" in our dual-computer setups. We each had one computer connected live to an FSFORUM conference room while a second lie waiting for FS5 Dual Player calls from incoming pilots. While in flight, many of our pilots who were lucky enough to have a second computer available to them would log on to FSFORUM and join us in the Fly-In conference room. They would log on and use their Fly-In callsign as their conference nickname, appending the text "~RADIO" to the end of their callsign to indicate to the rest of the crowd that they were conferencing while in flight towards LAS.

We sure had our share of memorable moments! Among the more positive ones was the arrival of our first-ever *blimp* pilot! His approach and landing, while a little on the long side, generated a lot of excitement and conversation in the Fly-In conference room. We also had a member fly a British Airways 747 non-stop from London's Heathrow Airport all the way to Las Vegas, and his simulated flight was later written up in a real-world London newspaper!

While we enjoyed those memorable moments, we had our share of sour ones. For one thing, we hadn't done a great job in anticipating the huge turnout we'd have, and our traffic management system wasn't up to the task. Several pilots were left in long holding patterns while they waited for clearance into McCarran. The main reason for this was something we never considered happening: our USA approach coordinator was bombarded by so many calls from incoming pilots that he was unable to use his phone to make *outgoing* calls to pilots already on hold! This slowed us down considerably, and until we worked out a backup plan, we had some pretty crowded skies above Las Vegas.

But the Fly-In turned out to be everything we'd hoped it would be. The combination of a liberal dose of new ideas and the invaluable contributions of scenery designers and programming experts helped to make the Fly-In 11 the most popular in the history of FSFORUM.

WHAT? AGAIN?

When you've spent a great deal of time working on any particular project, one of life's sweetest rewards is the positive feedback you receive from those who benefited from your work. The days and weeks following an FSFORUM Fly-In are just that for those of us on the Planning Team, and the feedback we got from our members regarding Fly-In 11 was almost as exciting as the event itself. One thing came up, however, that we *never* anticipated.

Somebody wanted to do it all again. And sooner rather than later!

The idea was raised that we should follow up with Fly-In 12, this time to Atlanta, Georgia in time for the 1996 Summer Olympic games. I found the thought *very* interesting, and judging by the private CompuServe Email I received from Michael some days later, so did he. We sent out messages to our Fly-In Planning Team to solicit feedback and found that everybody *loved* the idea! We didn't have the kind of planning time, this time around, that we had for Fly-In 11, so we had to move fast - our date for #12 was July 27th, and that was a scant two months away!

We found scenery in cyberspace that had been done previously for Atlanta's William B. Hartsfield International Airport, and after securing permission from that scenery's designer, we needed only a few "enhancements" to give the scenery an Olympic "feel". Our resident designer Jim Crummy took on the task of designing a *beautiful* version of Olympic Stadium, and we recruited the talents of FSFORUM staff member Russ "Rush" Mueller to add some "Easter eggs". Rush used Flight Shop's Aircraft Factory, in combination with a product called PreFab from TekMate, to create a wonderful FSFORUM blimp that hovered over Atlanta's Fulton County stadium. He also put together an absolutely stunning Olympic torch that burned brightly right outside Jim's Olympic stadium.

These new scenery elements, combined with a newly revised adventure from Robert MacKay, highlighted our Fly-In 12 offering. Response was once again wonderful, and a newly revamped traffic management system kept pilot holding times to an absolute minimum. Fly-In 12, like it's predecessor, was a rousing success!

If you've never experienced a CompuServe FSFORUM Fly-In, I can't describe the fun you're missing! The normally solitary experience of simulated flight is totally enlivened by the "white knuckle" feel of knowing you're being watched as you come in for that nerve-wracking landing. We hope to put together Fly-In 13 sometime in the Spring of 1997, so come on by and join us in the fun!

Many thanks to Michael Fisher, an FSFORUM Associate Sysop, for contributing the beautiful FS5 screenshot photos that accompany this article! A slap on the back and a few bucks under the table are off to him.

About the author; Greg Hannigan is an Assistant Sysop on CompuServe's FSFORUM and a long-time flight simulation fanatic. Greg's CompuServe ID is [71554,763] - drop by the forum and say Hello! [MW✈]

with Jonathan Stern

Let's Get Real

Many lessons can be learned from the tragic April 3rd accident that took the lives of the U.S. Secretary of Commerce and dozens of business leaders when their military version of the Boeing 737 struck the hills to the northwest of Dubrovnik's airport. Unfortunately, tragic accidents often provide not only the impetus for regulatory and procedural change but also the fodder for the future training of pilots. Airlines routinely incorporate prior accidents into their classroom and simulator training for pilots.

Just one of the lessons learned in this case is one that many have long known. The most simple of navigation instruments, the Automatic Direction Finder or ADF, is also the most difficult to interpret in certain situations. And because of its imprecision and resultant infrequent use, many pilots are inept at navigating using this device — particularly with strong crosswinds. In the July issue of *Flying* Magazine, Richard Collins referred to the use of an NDB approach in this age of GPS navigation as "embracing archaic technology." He also recalled his days as an instrument flight instructor of Air Force pilots when he and his colleagues agreed that only about half of the flight school graduates "really understood how to accurately navigate using an ADF."

Notwithstanding Mr. Collins' contempt for NDB approaches, the fact remains that many airports are served only by NDB approaches; Dubrovnik's airport was but one example. According to *Aviation Week & Space Technology's* June 17th issue (citing the U.S. Air Force's investigation), numerous errors and circumstances combined to cause the accident. Those that relate to the NDB approach are as follows: (1) the approach course called for the crew to fly along the 119 degree bearing from the KLP NDB but the crew flew the 110 degree bearing; (2) the approach was improperly designed, failing to provide sufficient obstacle clearance; (3) the missed approach point could only be identified by tuning to a second NDB, the CV locator, and the airplane was equipped with only one ADF (which was still tuned to the KLP NDB after the crash).

Within days of reading the *Flying* and *Aviation Week* articles referenced above, I received in the mail a booklet from an investment newsletter called *The Wall Street Underground* (Burnsville, Minnesota). That booklet set forth an intriguing (but highly improbable) conspiracy theory for the accident: U.S. operatives working for the benefit of President Clinton paid or otherwise caused a Croatian radio technician to displace the approach NavAid and cause the flight to fly directly to the impact point. The reported motive: the Commerce Secretary was "going to prison" and "Bill Clinton's presidency was surely going down with him." Inaccuracies in the account caused me to reject the theory out of hand, although it would make for an interesting novel. This accident suggested to me that it was an appropriate time to revisit some NDB basics and feature an NDB approach in the *Under The Hood* column.

ADF use and display technology is quite straightforward. Tune the correct frequency and confirm reception by listening to the audio Morse code signal. The ADF display is a single needle overlying a compass rose. In some airplanes, the compass rose can be manually rotated to correspond to the aircraft's heading; in others, the needle overlies a heading indicator (this is known as an RMI or radio magnetic indicator and is a very useful tool found on some of the instrument panels available for downloading). The ADF needle (assuming that it is properly tuned and in range) always points directly to the transmitter relative to the nose of the airplane. Accordingly, when the wind is

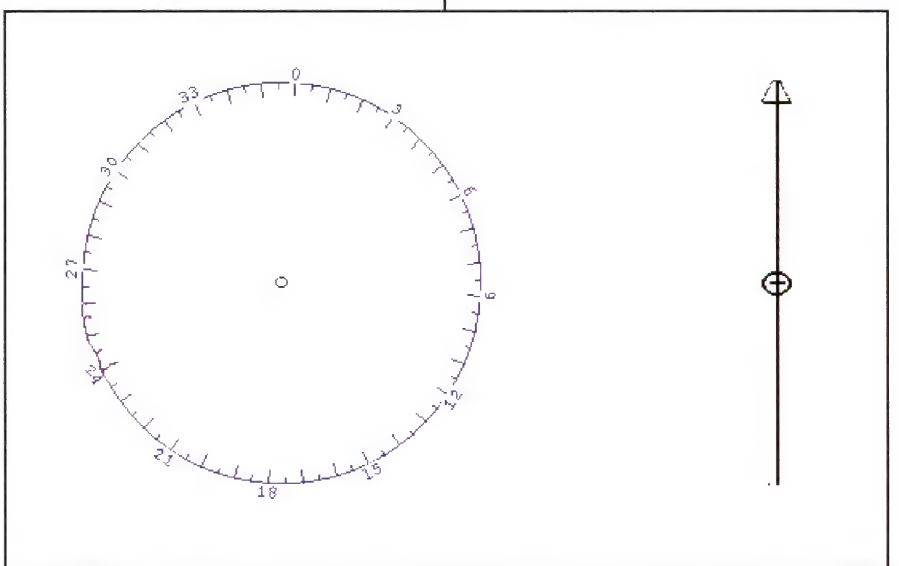


Figure UTH.1 - A VOR rose and compass needle you can cut out to help understand ADF's.

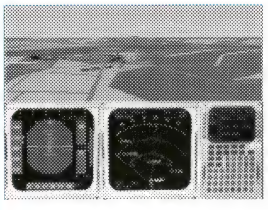
calm, a heading that puts the needle on the nose (the "0") will cause the airplane to fly directly to the NDB. Similarly, one can track from the NDB by turning to the desired heading from the transmitter and flying with the needle on the tail (the "18").

NDB tracking becomes far more difficult when crosswinds are introduced into the equation. The display remains the same; the needle still points to the transmitter. The difficulty in use arises from the fact that the variations in the position of the needle when wind corrections are introduced into the heading flown are not always obvious. As an instrument flight instructor, I have found useful the following exercise:

Create with paper or cardboard a simulated ADF display by placing a pointer needle on top of a compass rose. Figure UTH.1 can be cut out and assembled using a thumbtack and a piece of cardboard. In a room with sufficient floor space, place a simulated NDB transmitter (a can of soda works well) several feet from an imaginary runway (a book or dollar bill will do fine). Now, stand facing the NDB with the runway directly beyond the NDB and place the ADF on the floor with the "0" at your nose. Move the pointer so that the needle is on the "0" and pointed directly at the NDB. It should be easy to visualize that the needle will stay on the "0" until you pass over the NDB, at which point the needle will swing to the "18" position, as long as the airplane remains aligned with the runway.

Introduce a left crosswind into the simulation. Turn to your left 10 degrees to simulate a crab into the crosswind. Turn the pointer on the ADF so that it continues to point directly at the NDB. Note that your left crosswind correction causes the needle to point the same number of degrees in the opposite direction. A 10 degree left crosswind correction results in the needle pointing 10 degrees to the right of the nose. As long as the pointer remains on the 10 degree mark, the airplane is on course. If the needle moves to the right, the airplane has drifted left of course, and vice-versa. A more thorough discussion of NDB tracking techniques is contained in Chapter 18 of my recent book, *Microsoft Flight Simulator Handbook* or in Chapter 6 of *Flying On Instruments With Flight Simulator.* Unfortunately, there is not room for a comprehensive discussion in this column.

The result appears to change dramatically after station passage. As you will see by moving your ADF display beyond the NDB, a left crosswind correction now results in the ADF needle turning the same number of degrees to the left. With a 10 degree left crosswind correction after passing the transmitter, the ADF pointer will now be on the 190 degree mark with the airplane on course. If that crosswind correction is too little and the airplane drifts left



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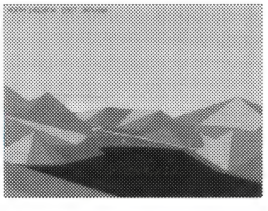

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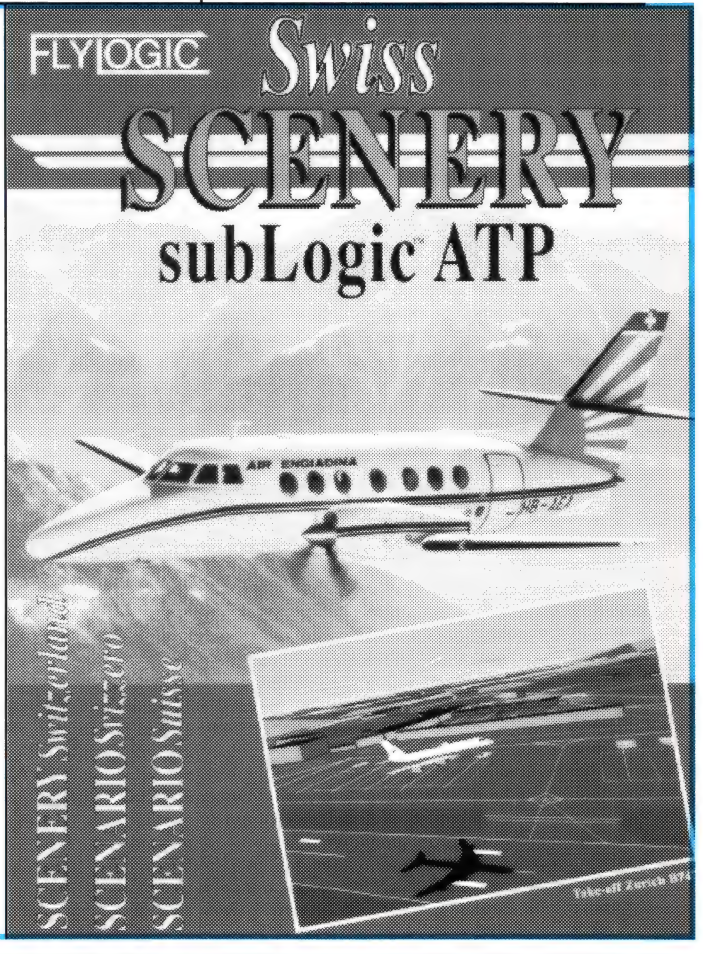

of course, the needle moves back toward the tail toward the "18." The instrument is simple, the needle always points to the transmitter; the interpretation, however, can be quite confusing. Practice is the best assurance of proficiency, yet the infrequent use of the NDB approach causes most pilots to miss out on NDB practice.

For the sake of practice, let's use *Flight Simulator* to fly the NDB Rwy 16R approach to Reno Cannon International Airport. The approach chart appears in Figure UTH.2. Takeoff from runway 34L at Reno Cannon and track directly to Sparks NDB, which is the initial approach fix for this approach. Climb to 9,000 feet. I recommend that you fly this at least twice, the first time without wind, the second time with a crosswind. After reaching Sparks, track outbound on the 344 degree bearing from the transmitter. If you turn to the 344 degree heading immediately upon reaching the station, it should be a matter of a few very small corrections to get on course where the needle points to the "18" while the heading is 344. We are required to remain within 10 nautical miles of the NDB for this approach, so fly outbound for two minutes before beginning the procedure turn.

The procedure turn is a very simple maneuver that requires first a left turn to a 299 degree heading, which is flown for one minute and then a right turn to a heading of 119 degrees. As with most procedure turns, we are now on a heading 45 degrees different than the final approach course. Accordingly, as the needle moves clockwise toward the 45 degree mark on the ADF, begin a smooth turn onto the final approach course. Timed properly, the heading indicator will reach 164 degrees as the ADF needle lines up on the "0." Minor adjustments are often necessary.

The airplane should now be descended to 8,200 feet and configured for the final approach. As you pass the Sparks NDB, extend the landing gear, note the time, and begin a descent to 6,700 feet. DICEY intersection, which is identified by the 295 degree radial from Mustang VORTAC, is a step-down fix. After passing DICEY, the descent may continue until reaching the minimum descent altitude of 6,060 feet.

The missed approach point is determined solely by elapsed time. This can be calculated using the time and speed table in the bottom right corner of the approach chart. For example, with a true airspeed of 120 knots and no wind, the elapsed time to the missed approach point is two minutes and 39 seconds. Assuming weather is not a problem on this approach, you should complete the approach and land.

If NDB approaches are not your strong suit, practice this approach several times under different conditions. First, fly the approach in visual meteorological conditions but with a 20 knot crosswind programmed. It is helpful to be able to see the airport and the relative angles of the airplane to the final approach course. After you have some comfort about your ability to fly the approach in the clear, try it with a low ceiling and/or reduced visibility.

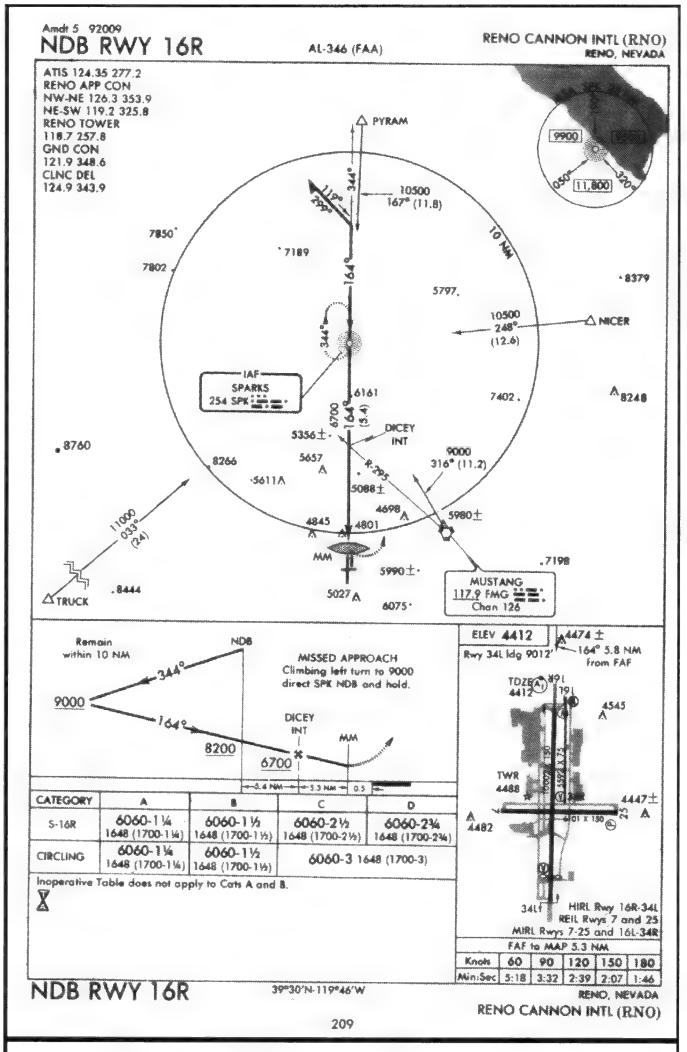

Figure UTH.2 - The NDB Runway 16R approach plate for RNO.

NDB approaches are becoming more and more rare. Despite the simplicity of the automatic direction finder's display of information, ADF interpretation, particularly in strong crosswinds, can stump even the most experienced pilots if they have not worked to maintain their proficiency on this type of approach.

About the author - Jonathan Stern is counsel with Dombroff & Gilmore, P.C. in Washington, D.C.. He holds comm pilot, CFI, ground instructor, and control tower operator certificates. He is also the author of two books on Flight Sim: Microsoft Flight Simulator Handbook and Flying On Instruments With Flight Simulator. Jonathan can be reached on CompuServe at ID 73502,2437. [MW✈]

Review Of: NavAid

NavAid is a shareware program that combines functions found in a variety of flight simulation support programs. The four major functions are an enroute map maker, an approach chart maker, an airport diagram generator, and a flight planner.

ENROUTE MAPS

In the early days of *Flight Simulator*, the database — which was then restricted to a few small areas in the Continental United States — was quite incomplete. Use of real enroute charts was difficult because of the limited replication of the many VOR's that dotted the countryside. The maps that came with *Flight Simulator* were not always the best, frequently reflecting disparities between the maps and the software's database.

It became apparent early on that there would be value in a program that could create visually-appealing and usable maps from the actual *Flight Simulator* database. *NavAid* is not the first to do this; the charter issue of *MicroWINGS* Magazine contained a review of, and advertising for, a map-making program that derived its data from the *Flight Simulator* scenery files. Since the release of *Flight Simulator* version 5.0, the need has diminished. The scenery database has been vastly expanded to include most of the navaids in the United States and many in other parts of the World.

NavAid produces maps by reading the scenery (i.e., .BGL) files resident in the *Flight Simulator* database. The desired files are identified within the "Open Flight Simulator Data Files" screen. Thereafter, a map, which provides borders, major coastlines, and the like — is selected. A variety of these maps comes with the program. After selecting the map, the user has several choices for how the map will be displayed, including the type of projection. Projection is the convention used to display a spherical shape on a flat piece of paper. Aviation charts employ the Lambert Conformal Conic projection, but other choices, including Mercator projection, are available.

Display options, which can be controlled within the menu structure or with icons that appear on a tool bar, allow selection of VOR's/VOR-DME's/VORTACS, NDBs, and Airports. A "Find" function will quickly center the map on a selected NavAid or airport.

The resultant maps can be zoomed in or out and printed on any Windows-compatible printer. On a color-capable printer, the airports are printed in black, NDBs in a pinkish-magenta, and VHF navaids in dark blue.

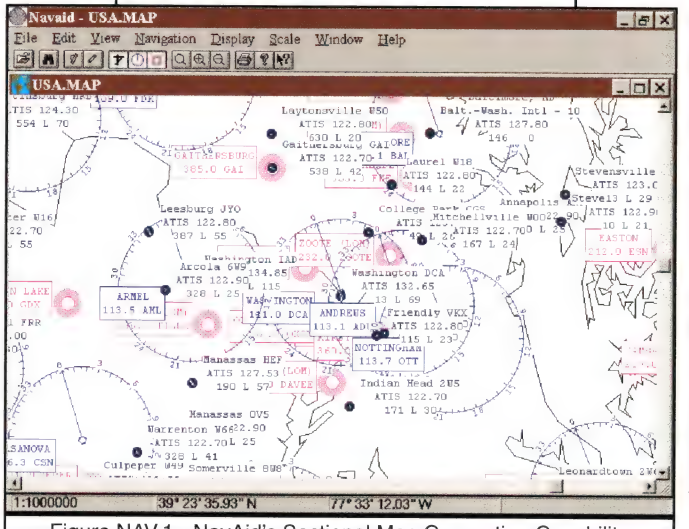

Figure NAV.1 - NavAid's Sectional Map Generation Capability

An exemplar enroute chart prepared by NavAid is depicted in Figure NAV.1. While the user has some ability to move NavAid labels, this capability is quite limited. The result will be that certain elements will overlap and some of the data (e.g., identifiers, frequencies) will not be visible.

NavAid's map-making utility especially comes into play for navigation in parts of the World for which real charts are not readily available to the user and/or at a low cost. There, *NavAid* will provide a database-accurate enroute chart that may otherwise be unobtainable as a practical matter. While I (living just outside of Washington, D.C.) can easily and inexpensively obtain enroute charts for the Continental United States, the same is not true for other parts of the World, and *NavAid* will prove useful for my flying exploits in those parts of the World.

AIRPORT DIAGRAMS

With a few clicks of the mouse buttons, *NavAid* will display an airport diagram for any airport in the database. Again, the actual *Flight Simulator* scenery provides the data employed in creation of the chart. The airport diagrams generated by *NavAid* are actually quite good. Because they are generated from data in the *Flight Simulator* scenery files, however, they do not have some of the details found on the actual charts. For example, windsocks, the airport's rotating beacon, end of runway elevations, and surrounding roads. On the positive side, however, the diagrams can display taxiway & buildings (new in version 1.2), approach light systems, magnetic variation, VASI lights, displaced thresholds, runway lengths, widths, and designators. Figure NAV2 displays an airport diagram for Love Field (Dallas, Texas).

APPROACH CHARTS

Unlike enroute charts, approach charts — for which there are many — are generally expensive to obtain. *NavAid* draws from the *Flight Simulator* database details about ILS or Localizer approaches, the airport served, and other navigation aids in the vicinity to produce an approach chart.

NavAid approach charts provide the following: (1) a heading with the name of the approach and the airport served; (2) a plan view containing the runway complex of the airport served, the localizer inbound and outbound course and frequency, a 10NM ring, the fan markers that comprise the approach procedure (in most cases outer and middle markers), and other navigation aids in the vicinity; (3) a profile view, which depicts the landing runway, the glideslope, the locations of marker beacons serving the

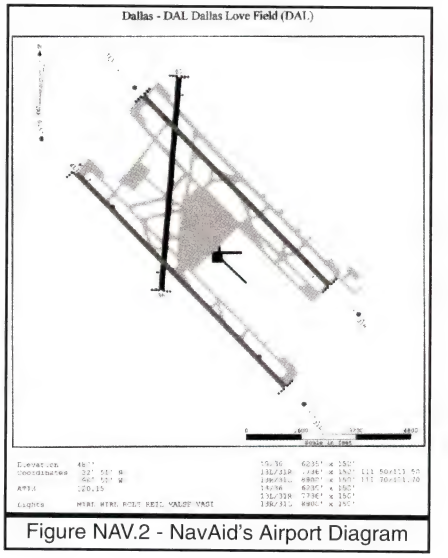

Figure NAV.2 - NavAid's Airport Diagram

approach, incremental ground distances along the approach, a missed approach arrow beginning at the missed approach point, and the glideslope altitude at the outer marker; and (4) a minima section which provides a decision height with height above touchdown as a parenthetical and a table of ground speeds and corresponding elapsed times to fly the approach. An example for Love Field's runway 31L is shown in figure NAV.3.

The shortcomings of these charts are easily understood when the manner in which they are generated is considered. Missed approach procedures are not shown graphically or textually. The software has no way of knowing what they are for a given approach. Likewise, holding patterns, procedure turns, feeder routes, transitions, obstructions, and indications of initial approach fixes, or IAF, are not shown in the plan view. The profile view lacks a glideslope intercept altitude.

NavAid's chart creation logic assumes that the decision height on a given ILS approach will be 200 feet above the airport elevation. This may be incorrect for two reasons. First, not all Category I ILS's have 200 foot decision heights. Some are at 250 feet; others at 300. Second, decision heights are based not on airport elevation but on touchdown zone elevation, or TDZE. TDZE is the highest elevation of the first 3,000 feet of the usable portion of the runway. In the case of runway 30 at Long Beach Airport, the TDZE is 35' and the decision height is 235 feet. The *NavAid*-generated approach chart for the ILS Rwy 30 approach depicts a DH of 256 feet, which it calculates by adding 200 to the airport elevation of 56 feet.

In generating approach charts for localizer approaches (i.e., ILS's without a glideslope), *NavAid* depicts a glideslope and lists a decision height of 200 feet above airport elevation. Localizer approaches do not have a decision height; they have instead a minimum descent altitude, or MDA. MDA's are usually considerably higher than DH's. For example, the localizer approach to runway 8 at Burbank, California, has an MDA of 1,540 feet. The *NavAid* approach chart for that approach shows a decision height of 974. For this reason, *NavAid* probably should not be used to prepare approach charts for localizer approaches.

Are these shortcomings insurmountable? No. Since the first days of *Flight Simulator*, its use has required varying degrees of improvisation. If used in conjunction with *Flight Simulator Flight Shop's* ATC Adventures, radar vectors onto the final can be received. Without *Flight Shop*, one can improvise a feeder route from a navigation aid to the final approach course. Likewise, missed approach procedures can be improvised. Moreover, the variation between actual decision heights and *NavAid*-displayed decision heights is not likely to be of consequence in a simulated environment.

Approach charts for use with flight simulations are available from a number of other sources. They may be purchased from the government (The Department of Commerce's National Ocean Survey in the United States) and from a commercial publisher — *MicroWINGS* Commercial Member Jeppesen. *Final Approach*, a shareware program authored by Georges Lorsche can be used to generate approach charts prepared by flight simulation enthusiasts. There are many approach charts that will not be available from *NavAid* because *NavAid* will only prepare ILS and Localizer approach charts. The other sources will provide NDB and VOR approaches, as well. Nonetheless, if you have not made the investment in approach charts, *NavAid's* approach chart generator may prove useful.

FLIGHT PLANNER

NavAid also provides a very easy to use and fast flight planner. After selecting a protractor symbol icon and setting an option for auto-route, the departure and destination points are clicked on with the mouse. In seconds, a flight plan, which can be displayed and printed, is produced. Figure NAV4 depicts a *NavAid*-generated flight plan for a trip from Washington, D.C., to Los Angeles.

The flight plan is very basic; it contains waypoints and their IDs and frequencies, elevations of the terrain at the waypoints, Latitude and Longitude of each waypoint, true and magnetic courses, and distances. Information on cruise altitudes, winds, wind correction angles, and speeds is not available. While several good flight plans were generated when I tested *NavAid*, the Washington to Los Angeles trip shown in Figure NAV.4 left a gap in the flight plan between the Hays and Lamar VORTAC's.

A demonstration version of *NavAid* can be downloaded from CompuServe's Simulation Games Forum

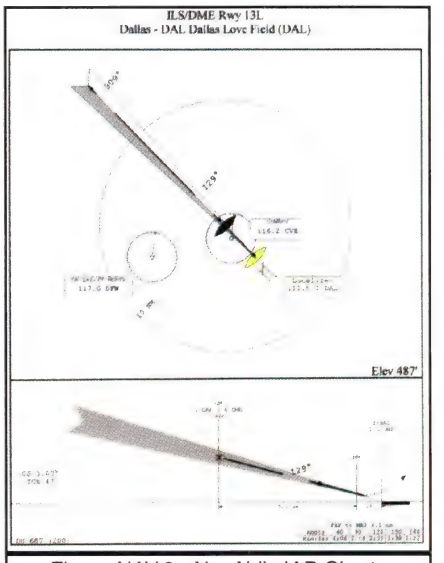

Figure NAV.3 - NavAid's IAP Charts

(in the Civil Aviation library) and is limited to a United States map and specified BGL files. A registration fee of $20 provides the full program, updates, and technical support by E-mail or snail mail. *NavAid* 1.2 is the work of Peter A. Jacobson. Despite the shortcomings in usefulness that I have identified, *NavAid* is a solid Windows program that is fun to use and a pleasure for users who enjoy maps.

About the author - Jonathan Stern is counsel with Dombroff & Gilmore, P.C. in Washington, D.C.. He holds comm pilot, CFI, ground instructor, and control tower operator certificates. He is also the author of two books on Flight Sim: Microsoft Flight Simulator Handbook and Flying On Instruments With Flight Simulator. Jonathan can be reached on CompuServe at ID 73502,2437. [MW✈]

Waypoint	ID Freq	Elev	Position	To Next Waypoint Course	 Distance	 Comments
Washington DCA		13	N 38° 51.1' W 77° 02.2'	272T 282M	143.0 nm	VOR DCA 111.00
	132.65					
ELKINS	ELK	2159	N 38° 54.9'	265T	90.6 nm	
VORTAC	114.20		W 80° 06.0'	272M	143.0 nm	
HENDERSON	HNN	860	N 38° 45.2'	267T	107.2 nm	
VORTAC	115.90		W 82° 01.6'	273M	233.6 nm	
FALMOUTH	FLM	810	N 38° 39.0'	274T	154.1 nm	
VOR-DME	117.00		W 84° 18.6'	277M	340.8 nm	
LAWRENCEVILLE	LWV	430	N 38° 46.2'	270T	108.5 nm	
VOR-DME	113.50		W 87° 36.0'	270M	494.9 nm	
TROY	TOY	571	N 38° 44.4'	273T	107.7 nm	
VORTAC	116.00		W 89° 55.1'	272M	603.4 nm	
COLUMBIA	COU	883	N 38° 48.6'	272T	117.7 nm	
VOR-DME	110.20		W 92° 13.1'	269M	711.1 nm	
JOHNSON CO	OJC	1030	N 38° 50.4'	275T	99.5 nm	
VOR-DME	113.00		W 94° 44.2'	270M	828.8 nm	
FORT RILEY	FRI	1240	N 38° 58.2'	267T	113.0 nm	
VOR	109.40		W 96° 51.7'	260M	928.3 nm	
HAYS	HYS	2021	N 38° 50.9'	258T	60.0 nm	
VORTAC	110.40		W 99° 16.6'	250M	1041.3 nm	
		2690	N 38° 38.2'	257T	60.0 nm	
			W100° 31.8'	248M	1101.3 nm	
		3950	N 38° 24.7'	254T	44.8 nm	
			W101° 46.5'	244M	1161.3 nm	
LAMAR	LAA	3950	N 38° 11.8'	252T	156.8 nm	
VORTAC	116.90		W102° 41.3'	242M	1206.2 nm	
ALAMOSA	ALS	7530	N 37° 20.9'	252T	115.1 nm	
VORTAC	113.90		W105° 48.9'	241M	1368.0 nm	
FARMINGTON	FMN	5820	N 36° 44.9'	257T	157.6 nm	
VORTAC	115.30		W108° 05.9'	245M	1478.1 nm	
TUBA CITY	TBC	5046	N 36° 07.3'	249T	139.7 nm	
VORTAC	113.50		W111° 16.2'	236M	1635.7 nm	
KINGMAN	IGM	3409	N 35° 15.6'	258T	127.3 nm	
VOR-DME	108.80		W113° 56.0'	245M	1775.4 nm	
HECTOR	HEC	1850	N 34° 47.8'	243T	109.1 nm	
VORTAC	112.70		W116° 27.8'	229M	1902.8 nm	
Los Angeles Intl.		126	N 33° 56.6'			VOR LAX 113.60

Figure NAV.4 - A Flight Plan from DCA to LAX

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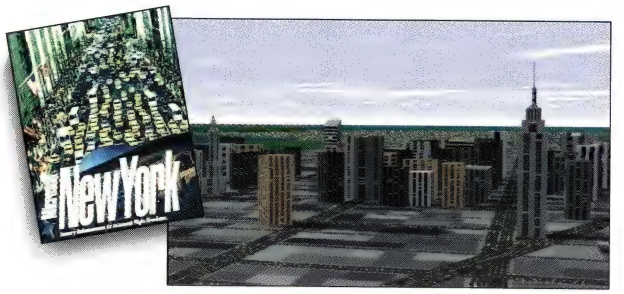

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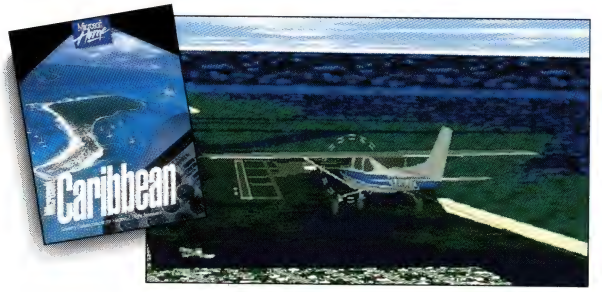

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Review of...

Precision Training's On-Top

Precision Training Software's latest release for pilots is the On Top IFR Proficiency Platform. On Top simulates a fixed gear Cessna 172, a retractable 172, and a retractable gear Cessna 182. Unlike Precision Training's earlier release, Instrument Pilot, which is marketed as an IFR Training Platform to supplement the flight training and ground training for an IFR rating, On Top is purely designed as an IFR proficiency simulator for those that already posses an Instrument rating. It is somewhat similar to the Instrument Pilot program minus the instruction and grading module with some enhancements in graphics and two additional aircraft to choose from.

Installation and start-up couldn't be easier, the simulator ships on just two floppy disks and requires no additional hardware beyond a normal joystick or flight control yoke. There are no external adapters or control boxes to tangle up your office. On Top requires a 25MHz 80386 computer or better, a mouse, 640K of conventional RAM (540K free convention RAM), 2MB of Extended memory, and 2MB of hard disk space. For optimal performance, the author of this review recommends a VESA compatible SVGA graphics card, and a faster computer such as a 66MHz 486 or a Pentium Processor based system. Soundblaster compatible cards are supported and engine noise, marker beacons, and ident sounds are channeled through the sound board. The PC speaker can also be used. On Top was originally designed to be run under DOS and the version reviewed (v2.11) would not even run under Windows. However, the latest shipping version (v3.0) can be run under Window 3.1 and Win95. An advanced joystick calibration facility is included which allows the user to adjust control travel as well as sensitivity. It also allows the assignment of the joystick buttons to various functions. The default for button two is reset so if this button isn't reprogrammed and you accidentally hit the button, your entire flight is negated and you start over. Unfortunately, the facility to program the buttons is not available if you are using the SVGA panel so an accidental press of the wrong joystick button can wipe out hours of flying on a cross country flight.

Figure OT.1 - The new, photo-realistic panel in Precision Training's On-Top IFR Sim.

On Top offers a VGA panel for each aircraft. For the C182RG two panels are offered: one is a standard VGA panel for slower systems without advanced graphics hardware, the other is a photo-realistic SVGA panel that uses 800x600 pixel resolution with 256 colors. This was the panel primarily used during the evaluation of the software. Both panels contain similar instrumentation. One COM radio, two NAV radios, an ADF, a DME, and a Transponder make up the avionics stack. Standard instrumentation includes the six primary flight instruments (Attitude Indicator, Heading Indicator, Airspeed Indicator, Turn Coordinator, Altimeter, and Vertical Speed Indicator). The retractable gear airplanes utilize a Horizontal Situation Indicator (HSI) instead of a heading indicator There is no autopilot or area navigation (RNAV) capability. The panel looks very good although its colors are a little subdued which is common for the high resolution photo-realistic panels designed for flight simulators. Needle and gauge movement is very smooth. The author did find a small flaw in the photorealistic display which blanks out the timer/clock once the configuration menu has been selected... when you return to flying the aircraft the clock and menu are no longer visible and are replaced by a white square. The external graphics on the 100MHz Pentium system that this software was run on is very smooth. The frame rate is above the threshold for the eye to detect even in SVGA mode. On Top's advertisement states that a look left and look right feature is included in the software; however, I was unable to find documentation of how to engage this feature in the manual. Finally I figured it out; by clicking on the left side or the right side of the windshield one can look out either side. The included navigation database covers all 50 states and includes all IFR airports in the US.

Flying the On Top simulator is very easy for the experienced

flight simulation user. The manual is really not needed nor does it offer much guidance. This program is definitely designed for those that already know how to fly under instrument flight rules and have familiarity with flight simulators. The only flight area I found troublesome was elevator trim pitch. In the C182RG's SVGA mode, there are two controls and the manual does not explain how to properly use them. I was never able to get the aircraft properly trimmed. I'm certain there is a trick but I couldn't figure it out (in the lower resolution VGA mode, the trim is much more intuitive and was used with complete success). Flight is accomplished via joystick or yoke and the throttle is operable on those joysticks that have a throttle wheel. All other functions are controlled via the mouse - this includes radios, landing gear, trim, etc. No keystroke combinations are required. The aircraft sounds are basic, i.e. just the engine sounds can be heard; there are no flap or landing gear sounds. The engine sounds are slightly muffled and do not sound very realistic. Since there are no landing gear sounds or tire screech sounds, it is difficult to tell weather you have landed or not. The transition from flight to rolling on the ground is graphically so smooth that you can't tell when you touch down. The only way to know whether or not you have landed is that the VSI goes to zero indicating that your decent has stopped. A little chirp sound at touchdown would be beneficial. The avionics sounds such as Marker Beacons and Morse Identifiers are much more realistic than the aircraft flight sounds.

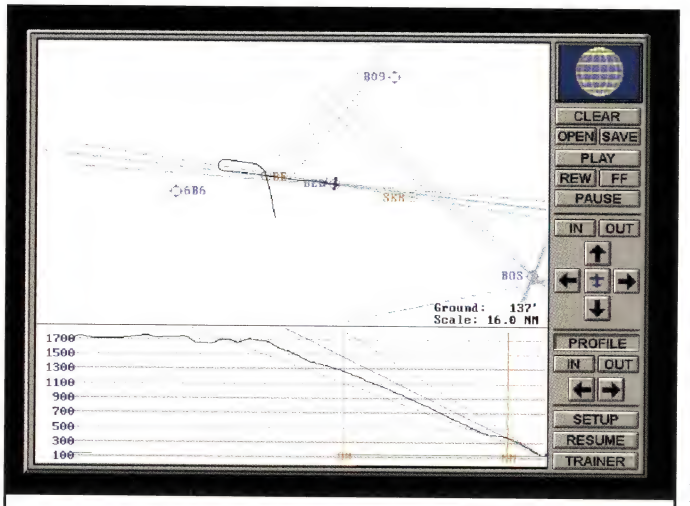


Figure OT.2 - The plot screen showing both overhead and profile views of your flight. The plot and even be 'played' like a VCR, complete with Pause, Rewind, and Fast Forward.

A map screen is also provided which allows the user to review the progress of the flight and to evaluate his or her performance. When switching to the map screen, On Top drops out of SVGA mode back to a lower resolution VGA mode - when going back to flight mode, the SVGA graphics are restored. The map has instant replay and profile features as well as fast forward, rewind, and zoom. One can also click on the airplane and drag it to a new location. I found the map to work quite well and it is highly intuitive to use.

The third major screen used in On Top is the configuration screen. This screen also switches out of SVGA mode and it also displays the map but the map functions are not available. It is used to set the weather variables, location, aircraft attitude, and whether it is night or day. This is also where you can save and load previously stored flights and configurations. On Top allows both cloud tops and ceilings to be set so that VFR On Top flight is possible. On Top uses a somewhat unorthodox convention for setting clouds. It uses height above sea level (MSL) for ceiling and tops. Real world weather briefings report ceilings as height above the ground (AGL) at the reporting station. If you want to set the clouds to ILS minimums (200 ft) at a 1,500 foot MSL airport, you would set the clouds to 1,700 feet instead of 200 feet.

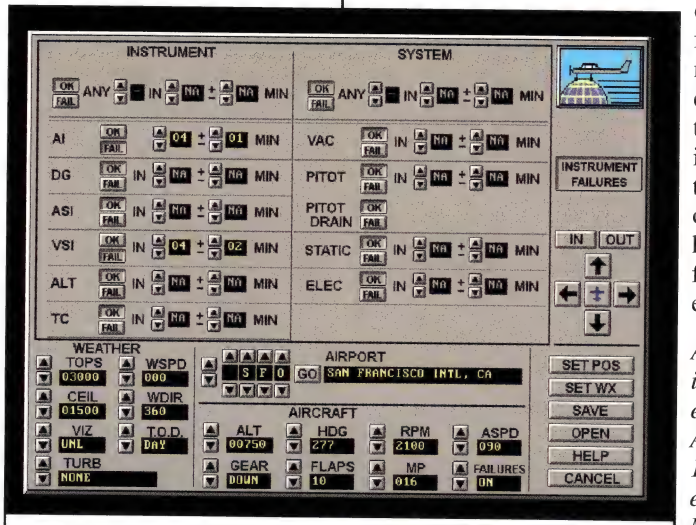


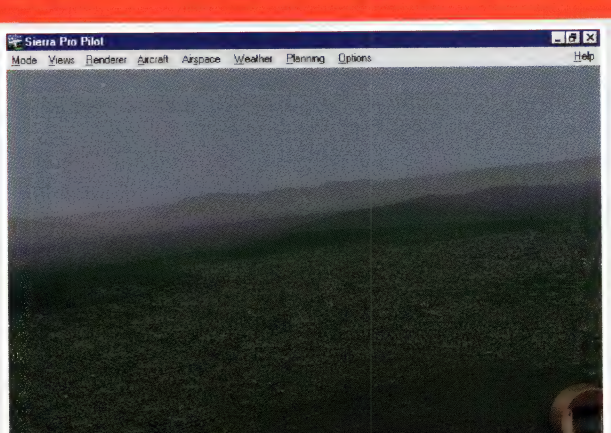
Figure OT.3 - The sim settings and instrument failure options screen.

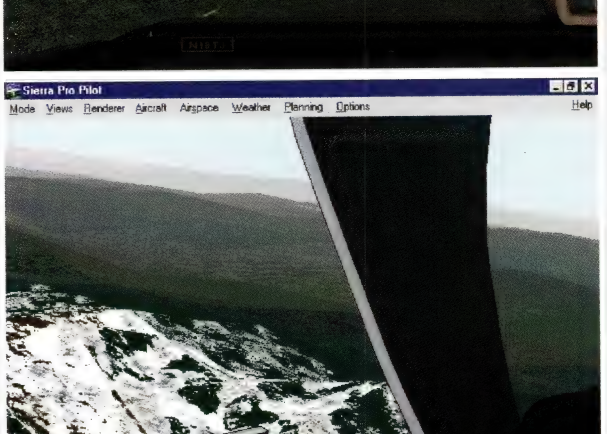
As always some visual flight rule (VFR) familiarization was necessary to insure I knew how to fly this airplane and how to use all of the instruments. Once I was comfortable in VFR conditions I departed on an IFR flight from the default airport - Bradley International. I practiced radial intercept, ADF bearing intercepts, and several approaches. The flights were uneventful and the simulation behaved as it should. I did have to fight pitch trim a lot which made the flights a little more difficult. The pitch trim is much more intuitive on the lower resolution VGA panels and I did not have any problems trimming the aircraft in that video mode. The Cessnas handle realistically and offer no surprises. If anything, they are more docile than the real airplanes and feel quite a bit heavier and slower in roll than the actual aircraft do.

On Top offers the Instrument Pilot a cost effective package for maintaining his or her IFR skills. At a cost of $349, it is one of the lower priced IFR proficiency simulators. It is also offered in configurations costing upwards of $1,300 with rudder pedals, a real aircraft yoke, and a separate power quadrant. Despite its relatively low, entry level price, it offers some higher end features such as a photo-realistic panel, several aircraft, an advanced map display, a three dimensional flight review feature, and a navigation database for the entire US. On Top is geared towards the pilot who already is instrument rated but wishes to maintain currency at home or in the office. It would be a highly useful proficiency tool for any pilot that doesn't get enough real instrument time.

About the author - E.J. Peiker is an instrument rated multi-engine pilot living in Chandler, AZ. He owns and operates a 1979 Piper Seneca II. He is employed as a Sr. Engineering Manager at Intel Corporation. [MW✈]

SNEAK PEEKS





SIERRA PRO PILOT UPDATE

You have seen several pictures in the past of the various panels and mountain scenes, so, here are some new ones showing new views: (left to right, top to bottom) The Cessna 172 above the cloud deck, High over a suburb as night falls on this part of the earth, Outside view of the Cessna and pilot figure on a left turn, and last, Snow covered mountains as we look over our left shoulder. Pro Pilot is expected to release sometime during the first quarter of 1997.

Flight Sim Trivia - Life Before Meigs

by Gene Lacy, DataWings

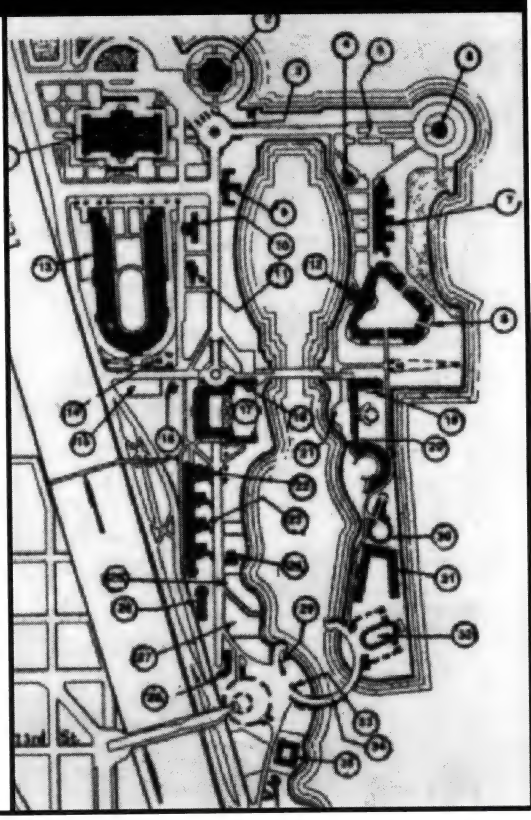
Have you ever wondered what the chart of Meigs Field would have looked like in the year 1933? Well, feast your eyes upon the example shown and let's shoot an imaginary approach to runway 36, but wait a minute! Where is runway 36?

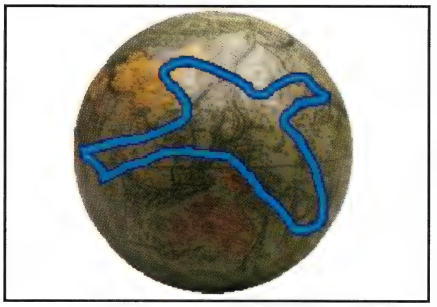
As we turn final for our approach from the south, let's drop down to 100 feet AGL for a low pass over the vintage Meigs Field and see what's going on! At the point where the numbers for 36 should be we buzz an interesting sight. It is a large exhibition area displaying the wonders of Hollywood's silver screens. We better keep a sharp eye out for King Kong, 1933's "Eighth Wonder of the World". As we throttle up and continue past the clutches of that terrifying beast, a unique curiosity is seen. Below is a horticultural exhibition adjacent to a fantasy place called Enchanted Island just about where the first taxiway turn off should be.

Next, we fly over a Social Science and Electrical Exhibit past our "missing" turn off and scan left for Meigs tower only to find something called the Edison Memorial. At roof top level, we proceed past some structures housing the States and Agricultural Group exhibits. Finally, we pull up sharply over the Promenade with the Adler Planetarium off our right wing tip and climb back out over Lake Michigan for our missed approach.

We have just witnessed life as it was before Meigs Field. In 1933, the City of Chicago hosted the World's Fair, "A Century of Progress" on the very site where our Meigs Field is now located.

Today, in 1996, the City of Chicago is considering proposals to close our favorite real and virtual airport and turn the site into some form of family park or recreation grounds. At least now we know where such an idea may have originated. Personally, I just can't determine whether the visionary leaders of Chicago are looking forward with new ideas, or looking backwards with old ones. *[MW✈]*





Virtual Round Robins

The term Round Robin is used by many aircrews to describe a flight route that completes a circuit (ends where it begins). Normally, a practice approach is flown at each airfield on the route.

by Al Pelletier

Hi Flight Simmers - Welcome to the 2nd Round Robin (RR) written for MicroWINGS magazine.

This RR takes place in the States of New York, Connecticut and Massachusetts, USA and was flown with Microsoft FS5, but can be flown with any Flight Sim that has the required airports and navaids. The RR's use "real" world Navigation. The highlight of this RR is a short and difficult maneuver/course to intercept the ILS at New Haven.

Scenery Microsoft Default FS5.1 and MW-RR02.ZIP scenery by Eric Mitchell. This scenery file adds ILS approaches at Bridgeport New Haven/Tweed and La Guardia RWY 22. and can be found on the Internet at http://www.microwings.com, http://mars.ark.com/~apeltier/scenery, http://wings.ark.com, or at the ftp.iup.edu site. If you have other add-on scenery that added the required ILS, it will work also. i.e.: John Trindle's ISS.

If you did previous RR's, skip the next paragraph, jump right in, and have fun.

For those who are new to this, Round Robins are published with the intent of having Flight-Simmers fly, look at the scenery, refresh our Geography, practice our cross country navigation , do some approaches at different airports all over the world, and have some FUN. In the message, you will be getting info like: airport departure and runway number , VOR's and ADF's en route, two or three middle airport destinations for VFR or INST approach, and back to your point of departure (round robin) for an INST or VFR approach, along with ILS and LOM freqs, minimums, procedures etc. You will also get info on the scenery needed to complete the flight and where to get it. Also, who created the scenery (for non-commercial) and a little background on the geography of the area.

May I also suggest, that you READ the route a couple of times before starting out, so that you'll have the flight plan fairly clear in your mind.

New York/La Guardia (LGA) ➲
Bridgeport/Sikorsky (BDR) ➲
New Haven/Tweed (HVN) ➲
Martha's Vineyard (MVY) ➲
and back to La Guardia.

SCENERY REQUIRED

MICROSOFT DEFAULT, and MW-RR02.ZIP by Eric Mitchell or other add-on scenery that has the necessary ILS approaches. *(note; do not load MW-RR02.ZIP if you have other add-on scenery that covers this area)*.

First Leg

La Guardia ➢ Bridgeport Sikorsky
distance approx. 40nm

- CLOCK 1910 (summer)
- Select La Guardia RWY 13.
- Dial in the Bridgeport (BDR) VOR 108.8 (no DME available).
- Taxi to and Take Off (T/O) Runway (RWY) 13, Left climbing to 7,000, Heading (HDG) 068.
- Track the BDR VOR. Once at altitude, dial in the BDR Localizer 110.7 on NAV1, in preparation for an ILS to RWY 06 (actual course 060, elevation 10).
- 25 NM out of the LOC, turn right HDG 075 to intercept the LOC and descend to 5,000.You should intercept at about 19 NM out.
- 5 NM back, you are cleared for a full stop to RWY 13. Check Gear Down.
- LAND Bridgeport.

EDIT WEATHER

At this point, pause and edit weather as per:

CLOUDS
type=user defined
base=2300
tops=3400
coverage=broken 7/8
turb=light

WINDS
surface wind
type=gusty
depth=3400
spd=15 kts
direction=360
turb=2

VISIBILITY

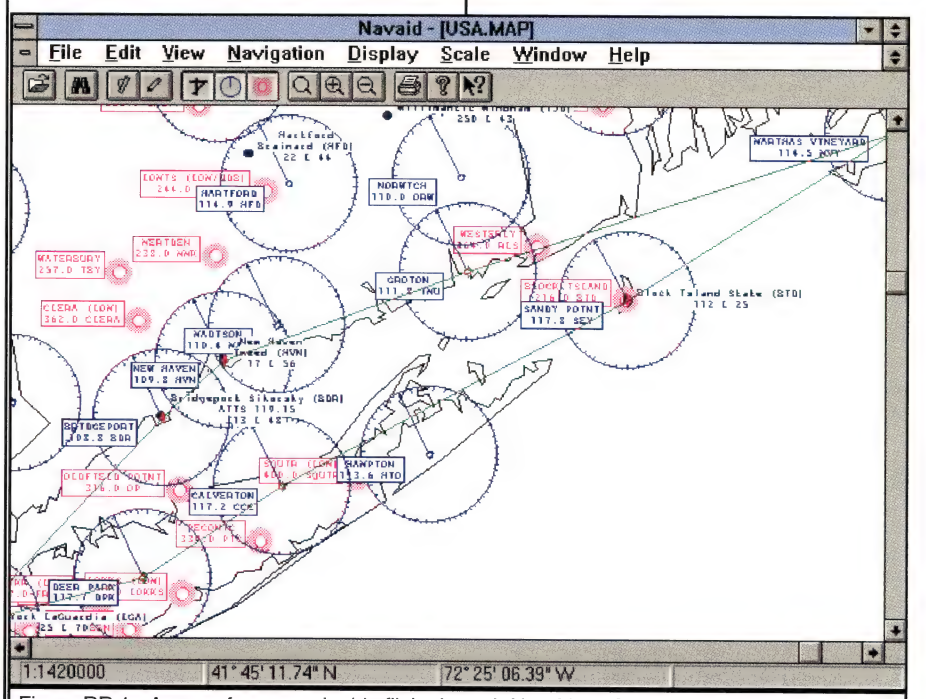


Figure RR.1 - A map of our round robin flight through New York, Connecticut, & Massachusetts.

Navaid - [MWRR02.FP]

File Edit View Navigation Window Help

Waypoint	ID / Freq	Elev	Position	To Next Waypoint: Course	Distance	Comments
LA GUARDIA VOR-DME	LGA 113.10	10	N 40° 47.0' W 73° 52.1'	056T 069M	40.6 nm	
BRIDGEPORT VOR	BDR 108.80	10	N 41° 09.6' W 73° 07.5'	060T 074M	12.4 nm 40.6 nm	
NEW HAVEN VOR-DME	HVN 109.80	10	N 41° 15.7' W 72° 53.1'	084T 097M	37.8 nm 53.0 nm	
GROTON VOR	TMU 111.80	10	N 41° 19.8' W 72° 03.1'	086T 100M	64.9 nm 90.8 nm	
MARTHAS VINEYARD VOR-DME	MVY 114.50	59	N 41° 23.8' W 70° 36.8'	253T 268M	45.6 nm 155.7 nm	
SANDY POINT VOR-DME	SEY 117.80	98	N 41° 10.0' W 71° 34.6'	256T 270M	57.1 nm 201.3 nm	
CALVERTON VORTAC	CCC 117.20	85	N 40° 55.8' W 72° 47.9'	250T 264M	24.4 nm 258.4 nm	
DEER PARK VORTAC	DPK 117.70	121	N 40° 47.5' W 73° 18.2'	268T 282M	25.9 nm 282.8 nm	
New York LaGuardia	LGA	25	N 40° 46.6' W 73° 52.4'		308.6 nm	VOR LGA 11

1:1420000 41° 28' 42.86" N 70° 51' 26.48" W

Figure RR.2 - Our Flight Plan for this round robin, using NavAid v1.1.

visibility=5

Second Leg

Bridgeport ➢ New Haven/Tweed
distance approx. 12.4nm

- Clock 1935
- Taxi to the button of RWY 11.
- Leave the BDR VOR on Nav2 , and set 122 on the OBI Dial in the HVN LOC 109.1 in preparation for and ILS to RWY 02 (actual course 016, elevation 13).
- T/O, right climbing to 3,500, turn right and fly down the 122 radial of the BDR VOR.
- Once you reach the Peper Int (Which is about 15NM or 5 minutes at 160 kts out of the BDR VOR, or after take off), and your Nav 1 OBI starts moving, begin Descent to 2,800 and turn Right HDG 190 and hold for one mile and then a right turn to 020.
- Intercept the LOC. You should be between 13 and 10 NM out of the LOC when you intercept.
- 5 NM back, you are cleared for a full stop RWY 02. Check Gear Down.
- LAND New Haven.

Third Leg

New Haven ➢ Martha's Vineyard
distance approx. 100nm

- Clock approx. 2000
- Taxi back to RWY 02.
- Dial in the Groton (TMU) VOR111.8 and the Westerly NDB (RLS) 264. (optional)
- T/O RWY 02, Right Climbing to 13,000. HDG 095.
- Track the TMU VOR (no DME, approx. distance 38 NM) to on top. On top TMU, dial in and track the Martha's Vineyard (MVY) VOR 114.5.
- 40 NM's out of the MVY VOR, begin descent to 5,000.
- At this point, change the surface wind to 270/15. The remainder of the weather remains the same.
- Dial in the I-MVY LOC 108.7 in preparation for an ILS to RWY 24 (actual HDG 236, elev. 68).
- Over-fly the MVY VOR. After on top, descend to 3,000, turn HDG 085 until you are 10 NM's out of the MVY VOR, then turn left HDG 300 to intercept the LOC.
- 5 NM back, you are cleared for a full stop RYW24, check gear down.
- LAND Martha's Vineyard.

Fourth and Final Leg

Martha's Vineyard ➢ La Guardia
distance approx. 151nm

- Clock 0700
- Edit WEATHER: Ceiling And Visibility Unlimited (CAVU), light winds.
- Taxi to RWY 24.
- Dial in the Sandy Point (SEY) VOR 117.8 and the Block Island NDB (BID) 216 (optional).
- T/O RWY 24, Right climbing to 18,000.
- Track the SEY VOR to on top, and then dial in and track the Calverton VORTAC (CCC) 117.2.
- Enroute to the CCC Vortac, dial in the Deer Park (DPK) VOR 117.7 and the LOM ORCHY (UR) 385, in prepara-

Figure RR.3 - AERO virtual Airline B737 on final to LGA RWY 22.

Figure RR.4 - AERO Virtual airline B737 taking off from MVY.

tion for an NDB approach to RWY22 (actual HDG 224 elevation 22).

- 15 NM out of the CCC, begin descent to 6,000.
- On top the CCC Vortac, track the DPK VOR to on top.
- On top DPK, turn Right HDG 306 and remain on the 306 radial of DPK. (there is an approx. 20 NM run to the Yoman Int).
- Descend to 3,000.
- Keep an eye on your ADF needle. Approx. 20 NM out of the DPK VOR, the NDB should be pointing to 224 magnetic. Turn left and fly to cross over the NDB on a HDG of 224, and descend to 2,000.
- On top the ORCHY LOM, you should be at an altitude of 2,000 and a HDG of 224. You are now 5.7 NM from RWY 22.
- Continue approach. You are cleared for a full stop RWY 22. Check Gear Down.

NOTE: If you downloaded the MW-RR02.ZIP file, the ILS to RWY 22 at La Guardia is also available. Freq 110.5.

- LAND La Guardia
- Welcome Home!

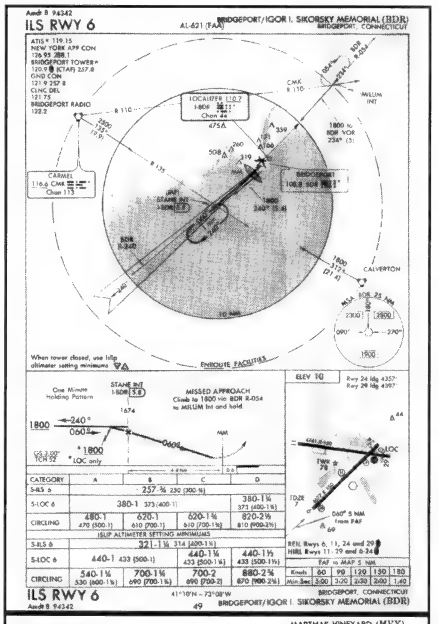
GEOGRAPHY

New York, the largest city in the United States, lies at the mouth of the Hudson River on the southernmost extension of New York State.

The city's major air-transportation facilities are the John F. Kennedy International Airport and La Guardia Airport, both of which are located in the borough of Queens. They are supplemented by Newark (NJ) International Airport.

Bridgeport (1990 census, 141,686) is a city in southwestern Connecticut situated on Long Island Sound, at the mouth of the Pequonnock River. In the 1970s, Bridgeport displaced Hartford as Connecticut's largest city in population. Long the state's leading industrial city, Bridgeport manufactures helicopters, trucks, electrical equipment, firearms and ammunition, gas turbine engines, sewing machines, pharmaceuticals, and radios. It is the site of the University of Bridgeport, Sacred Heart University, Bridgeport Engineering Institute, and Housatonic Community College

Martha's Vineyard, an island in the

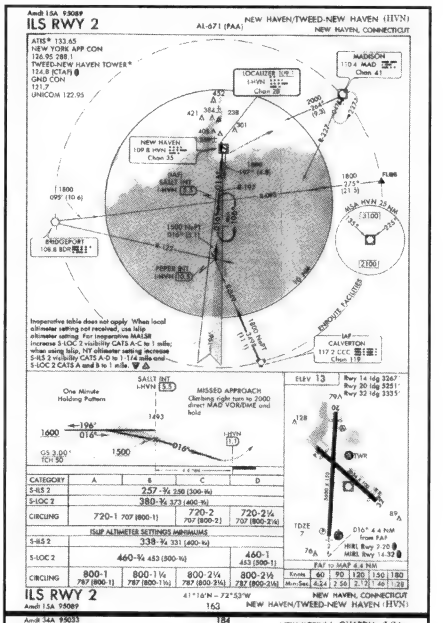


Atlantic Ocean located 6 km (4 mi.) off the coast of Cape Cod, is part of Massachusetts. It covers 280 sq. km (108 sq. mi.) and has a population of 11,541 (1990 census). Edgartown and Tisbury are the largest towns. Martha's Vineyard State Forest occupies much of the island. Brightly colored clay cliffs are located at the western tip. Martha's Vineyard was settled in 1642. During the 18th and 19th centuries it was a major whaling center.

Credits

1... Thank you to Eric Mitchell for compiling the ILS needed in this Round Robin, and for text flying the route. Thanks also to Peter Jacobson for the program "NAVAID11" which I used for Flight Plans, and maps.

2... I flew a B737 on this trip, but any



other A/C will do.

3... For the experienced flyers, please be patient through all of the explanations, directions and extras. I direct this column also to newcomers to the flying world, so I must stick to plain language for their sake.

Have Fun and watch for upcoming RR in the regions Europe, Canada and the Caribbean.

About the author - Al Pelletier served in the RCAF for 25 years, as aircrew on Maritime Patrol airplanes. Al has been flying Flight Sims since the mid 80's with MSFS V2.0 and is a member of the Comox Valley Stopover Flyers, (keepers of the "wings.ark.com" site). Al can be reached via Internet email at apeltier@mars.ark.com. [MW✈]

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Vista, CA 92083
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(714)366-9563 (F)
Publishers of Pilot-In-Command.

Flight Computing Catalog
42 Digital Drive #14
Novato, CA 94949
(415)883-7300 (V)
(415)883-7599 (F)
Publishers of Flight Computing Catalog (a collection of aviation products, software, & apparel).

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(619)434-1940 (V)
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Irvine, CA 92714
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(714)833-0322 (F)
Mfgrs of the Parallel Gameport.

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Englewood, CO 80112
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(303)784-4137 (F)
Authors & Publishers of FS-200 PC Instrument Simulator, Navigation Charts, Training Matls, & Pilot Supplies.

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Louisville, CO 80027
Assists the stars (developers) of the Flight Simulator software universe.

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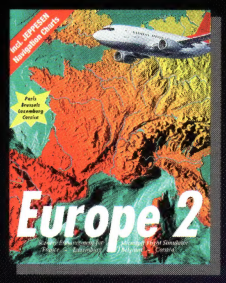

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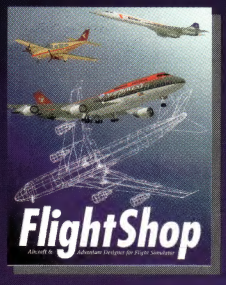

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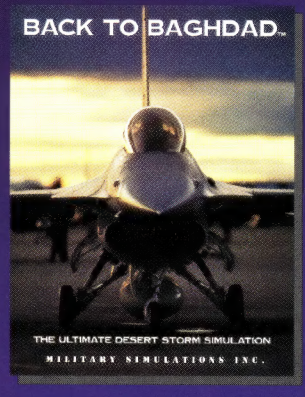

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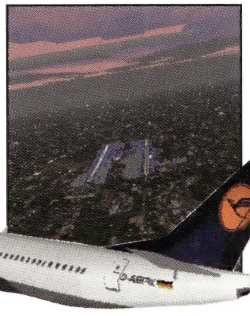

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